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REFUTATION

OF MR. COLDEN'S "ANSWER" TO MR. SULLIVAN'S REPORT TO THE
SOCIETY FOR ESTABLISHING USEFUL MANUFACTORIES
IN NEW-JERSEY UPON THE INTENDED ENCROACHMENTS OF THE MORRIS
CANAL COMPANY IN DIVERTING FROM THEIR NATURAL COURSE THE
WATERS OF THE PASSAIC.

ARRANGEMENT.

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- Page 16—line 35, read *easily* for *early*.
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LETTER IN REFUTATION, &c.

TO ROSWELL L. COLT, Esq. Governor of the Incorporated Society for
Establishing Useful Manufactories in New-Jersey—seated at Paterson.

SELF-DEFENCE calls for this notice of a recent pamphlet, entitled, "An Answer" to my Report on your concerns. The President of the Morris Canal Company has attempted to ward off the force of unquestionable facts, by opposing personalities and misrepresentations. A simple explanation of the transactions, which he has, in a very distorted form, summoned to his aid, will be found in a subjoined Note.*

There is for Mr. Colden an apology, which converts resentment into pity. We know the mind, especially in advanced life, is sometimes weakened by misfortune, and the occurrence of a name will then, by mere association, revive its memory, and, to an undisciplined or an unchristian temper, all its bitterness. Thus he can as soon forgive as

* *Note.* I was never among those who refused due honour to Mr. Fulton's ingenuity and perseverance. He was the successful improver, not the inventor, of steam-boats. The Legislature of New-York had granted an exclusive privilege to his predecessor in this art, *prior* to that granted to Livingston and Fulton. Laws had been made to encourage the progress of the useful arts and sciences. This field was as open to me as to him. An improvement was made, which both claimed to have originated. An arbitration was appointed. The award was in *my* favour. My patent gave me a right to use it on all the waters of the United States. Claiming to come upon those of New-York, I did not pretend that the monopoly was unconstitutional as regarded the citizens of New-York, but as affecting rights derived from the laws of Congress.

When other parties began to contend against the monopoly as *wholly* unconstitutional, I conceived the best policy of the North River Company was to fortify themselves with privileges under the laws of the United States; and I still think it highly probable, had pride permitted them to negotiate on equal terms

forget that *more than ten years ago* my interest happened to be opposed *in law* to his, in the question of the Steam-boat Monopoly. But I should descend from my self-respect, and be wanting in respectfulness to you, and even to the community, were I to follow his example. Without acrimony, these pages may be found to have *point enough* to interest the stockholders, and even the creditors of the company; and, perhaps, to awaken attention to the controversy between that corporation and the Society in every just and honourable mind in New-Jersey; for I shall take care that this antidote follow the poison which the President of the Morris Canal has widely disseminated there in the vain hope of injuring the reputation of a professional man, *where* he most fears those talents, such as they are, which he affects to despise. The occasion warrants a degree of freedom with the concerns of the company I regret to take. The stockholders, may, however, be more benefited by an open and close examination, than by Mr. Colden's letter. They will better understand their true position, and better know their president. I shall nought extenuate, nor set down aught in malice.

It may not be generally known, to them or to the public, that your Charter was granted in 1791; that after struggling for many years through a series of difficulties, incident to the novelty of the undertaking—the infancy of the mechanic arts—a low impost, and foreign skill—the Society, after heavy losses, has now at length, by good management and the accession of more active capital, become prosperous and valuable. One of the largest towns in New-Jersey has already risen under your charter, and more manufactories are established at Paterson, than are found in all the rest of the State besides. This institution does honour to the legislative foresight which founded and fostered it.

Invited by the assurance of inviolable protection, the original contributors of capital to a large amount, chose the Great Falls of Passaic to be their principal seat, and purchased the shores and the bed of this noble stream at this place. The legislature then may be said to have consecrated these waters to the manufacturing interest.

with their opponent in New-Jersey, this policy would have prolonged their State grant to this day.

Whether I conducted the negotiation prudently, or they wisely, is a matter now of not the least consequence to the public, nor to the parties; and Mr. Colden should be reminded, that the “preposterous pretensions” he ascribes to me, (page 4,) were those of his friend Fulton also.

2d. The Albany Railway was not interfered with. As a citizen, and as the agent of the patentee of the elevated railway, I had as good right to apply to the legislature as any other party; but I forbore to interfere with those who had the intention to apply, any further than to prevent them from having an act which would preclude Troy from the like advantage.

As I had resided, and was acquainted with the principal merchants there, I knew their trade required the same facility as that of Albany. The western business of that city could not have been expected to come or go by the way of Albany. There was no incompatibility in the two roads; and though the grant to the applicants was altered so as not to preclude Troy, it has left the route from Albany in possession of all its superior advantages and inducements.

In 1824, thirty-three years later, the Morris Canal Company was incorporated; its professed purpose to bring Lehigh Coal to the City of New-York across the State, and should experiment succeed in ascertaining that the furnaces of Morris County can use it, to supply them also.

It originated with a few gentlemen in Morris County, and commissioners being appointed by the legislature to investigate the ground, they reported that the basis of its practicability was the occurrence of a *spacious lake* on the route, situated on the summit of the mountain to be traversed, and which could supply the canal in both directions with not only a sufficiency, but with even three times as much water as the whole canal would require.

No mention was made of the Passaic waters, though lying conveniently in the way; and this *tacit acknowledgment of their inviolability*, was in accordance with the sentiment of the legislature. This, as well as the confidence of the Society in its charter, in a great measure prevented that solicitude and apprehension of interference, which otherwise would have sought, and would have unquestionably obtained, an *express prohibition* of such interference. If some who were then in the legislature are to be believed, had there been at that time the least whisper of the pretensions which the Morris Canal Company now make, their bill would have been rejected with *unanimous indignation*.

But believing that no such interference with your waters was intended, and willing to promote a work which promised to pass through Paterson, I learn no opposition was made. A clause recognised the canalling powers of the Society; but it was found with much surprise afterwards, that, in the absence of attention, permission to take one of the sources of the Rockaway branch had been, under some misinformation, included in the bill. This being unconstitutional, will, no doubt, be rescinded, if the Morris Canal act is still within reach of legislation, as it may prove to be.

Nevertheless, so long as the route was believed to be as originally

3d. While I resided at Troy, some one introduced to me a Mr. Brown, as a reputable mechanic, having a family living near the Arsenal, and employed there as an artizan, but not an enlisted man.

Brown said he had invented or discovered, by experiments made at his own house, that by using a certain proportion of powdered anthracite coal, with a very fine clay found near the place in Vermont where he was brought up, that he could make a crucible which would stand the intense heat necessary to melt wrought iron in order to carbonize it, in due proportion, into *steel*. He requested me to witness the process, and if satisfied, to assist him to take out a patent. I consented, provided he would *prove* to me that *he* was the inventor. To this end he brought a number of reputable mechanics, whom I required should make oath to what they stated.

It was afterwards found that Major Dalliba, commandant of the Arsenal, claimed the same invention—that he had invented it while Brown was assisting him in a long series of experiments. On further inquiry, I found Brown's story to be, that those experiments had not succeeded till he had himself discovered the utility of the coal and clay, and made them known to the major. Brown

contemplated, passing through the village, liberal offers of land and water were made in a manner consistent with the manufacturing interest.

The gradual development of the company's plan of construction soon, I understand, awakened a suspicion, either that they had discovered the lake supply to be inadequate, or that they had designs on the Passaic for some purpose other than that of merely supplying the canal. It was evident by their proceedings that they intended to take in the Rockaway branch at several points:—indeed, the fears of stockholders that the lake would not prove to be sufficient, had brought out the explicit declaration, by one of the officers of the company, of a design to take in the waters of this river—*still however persisting* that the lake was three or four times more than sufficient.

Remonstrances were made in vain: they answered in a manner bordering on derision, that they would bring in more water than they should take; while to their engineer they gave orders to make the canal, just as if they had the entire right and command of the Passaic and its branches.

To the reasonable objection made by the Society in saying—You have abundance and superabundance of water; why not, then, carry your canal over our streams in aqueducts as usual? Why, even without the plea of necessity, ruin our manufactories? If you could plead deficiency, it would be no excuse—ours being the older charter. Were they to bring ever so much, you asserted, and still assert, they can have no right to take from *these* waters:—none of which can be spared from the manufactories—all of which were appropriated to their use.

The Morris Canal Company *now openly hold* the charter of the Society in defiance, and claim under a mere act of incorporation to make a canal, to take and divert away every stream on which the manufactories depend; at the same time still asserting that they have a five-fold sufficiency besides.

The company's thus overleaping the bounds of corporate authority, has put the manufacturing Society on the defensive for its existence in practical usefulness. An allusion in my report to that evident

proved that he had sent his apprentice for the clay—and for a little of the coal by his neighbour, a contractor on one of the Pennsylvania canals.

The arbitration between them, appointed according to law, gave their award in favour of the major, but not unanimously. Samuel M. Hopkins, Esq. was Brown's referee, and did not join in the award against him. If convinced that the major was the inventor, there was no reason why he should not. I assisted Brown through the arbitration. It was not a very uncommon case. Both parties had an equal right to invent, to experiment, and to claim the reward of their usefulness. My offence was in sustaining a humble mechanic against a commissioned officer. That officer, soon after his court martial, retired from the service to the retreat whence he vented his resentment by the letter giving his notions of this matter, and whoever knows him will have put a due value on them.

4th. Again, Mr Colden distorts a question arising between the *Dry Dock Company* and Mr. Thomas. That company owe it to me that they did not go into heavy, hazardous, and needless expense. It happened while at Washington that Mr. Thomas, well known there as a master shipwright,

scheme of aggrandizement, has touched the heart of the President of the Company, and caused him to pour out its bitterness upon me. I am thus compelled to enlarge on the proofs of this scheme, were any other necessary than to point to *their works*.

The impending controversy at law to defend the Society against the Morris Canal Company, had led your counsel (Mr. Wall) to advise that a civil engineer should be employed to ascertain and describe the manner in which the canal is actually constructed at those places where they have prepared to take Passaic water; and how it might have been differently constructed to avoid doing the injury impending—the quantity of water elsewhere at command of the company—its adequacy or inadequacy. You did me the honour of your confidence on this occasion; and it being on a subject exceedingly interesting to the manufacturers and town of Paterson, my report was, as usual with corporate statements, printed.

It may not have reached the hands of many who will see this letter. I therefore mention, that, in order to show the extent of the injury apprehended, it contains a statistical account of Paterson; also abundant proof that the legislature, as well as the commissioners, intended the company should use the waters of Lake Hopatcong *alone*, or together with the western and summit brooks. It shows that, allowing those waters to have been correctly measured by Professor Renwick, yet comparing that quantity proportionably with what is found requisite on Erie Canal, it would be so much deficient, that if the waters of the Passaic are diverted away to make up that deficiency, it would interrupt and ruin the manufactories of Paterson; for, though a canal suffers only in loss of time by suspension of its operation, manufactories depending on water power, cannot bear *any interruption* of supply whatever. It was Judge Wright's remark, that they require to be as regular as the sun.

In doing this duty, I had to refer to, and quote from, the State's Commissioners' Report, and the communications of the engineers—even

was introduced to me by a gentleman employed under government, as the ingenious inventor of the Railway Dock, which had received the approbation of a committee of the Columbian Institute, of which a navy officer of high rank was chairman. I was of course, at various times, led to converse with him on the subject; and he became solicitous that I should assist him in getting his improvement into use in our commercial harbours, where the tide falls but five or six feet, especially as one part of his invention is a method of cutting off the pile foundation of the railway, with mathematical exactness in slope and level, each pile in relation to all the rest—thus avoiding the heavy expense of a Coffre Dam, otherwise necessary. The Scotch marine railway had always been established where the tide retired far enough to permit of laying down the ways dry. His improvement also consisted of methods of shoring the ship.

Perceiving that a Dry Dock Company had been incorporated in New-York, I wrote to a member of it, suggesting that Thomas' Marine Railway, or Dock, would, at much less expense, answer their purpose. I was authorized, in reply, to send Mr. Thomas to this city. He came, and found the board much occupied with plans submitted to them, and wrote that he doubted his succeeding

those too of the officers of the company; but always, of course, with the courtesy and personal respect due to gentlemen with whom I might differ in calculation without enmity or incivility. Mr. Colden himself was mentioned only as saying that the lake, in his opinion, was five times sufficient for all the *locks* of the canal.

My surprise, therefore, was very great to perceive that the President of the Company had descended from the honour of his station, not to disprove my statements, but to borrow and retail refuted calumnies.

He addresses his letter to the Board of Directors of Morris Canal—and they will regret perhaps that he did not submit it to them before publication. I cannot believe that board could have read his letter in manuscript, as they would have advised against the introduction, not only of much irrelevant matter, but things which those who know me personally would have told him admitted of explanation.

Indeed, those gentlemen, however exempt by fortune from professional labours, cannot be therefore insensible, as he appears to be, to the value of character. They surely know too much of human affairs, had they also failed in magnanimity, not to have reminded him of a maxim at the bar among his profession, which implies *hear both sides*. As prudent men, to whom the company had confided a great concern, they would have foreseen the consequence of assailing the *professional standing* of an engineer, necessarily to be a vindication of it, which (unless the Society had been in their choice as imprudent as Mr. Colden wishes to have believed) would justify and *establish credence* in the very report which *he* is so unwilling to have thought to come from a competent mind.

No doubt it contains *startling facts*, which may well have prompted the board to the questions—*What they were now to think* of his declarations of the superabundance of the supply from the lake? Why if sufficient, invade the rights of the Society? Or, if not sufficient, why increase the length of the canal, and instead of terminating it in 76 miles at tide near Aquacknock, as originally intended, extend it to Newark 94 miles? Why unnecessarily cause heavy claims for damages? Why place the

to convince them that his was the only practicable one, unless I would come and explain the principles of it. I came, was introduced immediately, made the explanation, illustrating it by a sketch of a ship on the railway carriage, much as they now appear when drawn up. The Board of Directors voted to allow Thomas to build them one of his Marine Railways, giving him the same salary he had received at the Washington Navy Yard, which he accepted without compensation *especially for his* invention, it being a great object with him to exemplify it in *one* instance on a large scale of operation. This he accomplished to the admiration of the public, and the satisfaction of all the board, I believe, but one. Thomas sought for a practical opportunity before he took out his patents, though his improvements had been specified.

When the railway had commenced operation, and steam-boats began to present to be hauled out, perceiving that the *shear shores*, one of those inventions, were not so applicable to them as to ships, he devised a mode of supporting them, and other flat vessels, at *the bilge*, by a cradle formed of levers of the second class, propt from the side timbers of the carriage. This was a further improvement.

legislature, *contrary to its meaning*, in the appearance of violating their own charter to the Society—and even the Constitution of the United States?

“The Answer” must have disappointed them as men of business and sound discretion. Mr. Colden seems, indeed, to presume them unacquainted with the laws of New-Jersey, especially the respective acts of the two corporations, as I shall have occasion to show. But before proceeding to the examination I propose briefly to make of the grounds the President of the Company now takes to justify their aggressions on the Society, I shall, in a few words, remove the impression he has attempted to make, that I am not entitled to offer opinions, however sustained by experience and history, against *those* of the distinguished engineers, General Bernard and Colonel Totten, of the United States army—Judge Wright, Major Beach, and Professor Renwick, civil engineers.

It may not possibly have come within the knowledge of Mr. Colden, that I was considered by the President of the United States, Mr. Monroe, a civil engineer of suitable standing to form, *with the two first mentioned gentlemen, the Board of Engineers for Internal Improvement*, and when I was nominated to that office, the then Secretary of State, Mr. Adams, being a stockholder in the Middlesex Canal Corporation, for which I had constructed canals, now seventeen years the medium of the north-western trade from Boston, might have advised against my appointment, had he not thought it a proper one. Nor was his probable approbation unsustained, for I have in my possession (exhibited to your presiding officer) a testimonial from that corporation, an authenticated copy of a unanimous vote, expressive of entire satisfaction in my services as their engineer and agent for twelve years; at the expiration of which, I left their employ to attend to some distant affairs of my own, and a wider field of employment in the Middle State. And in regard to Judge Wright, we all acknowledge the value of *his experience, skill, and judgment*; and yet without any disparagement of *his* respectability, I may say, that before the Erie Canal was commenced, he came to view Mid-

The Dry Dock Company were informed that they might have these inventions for the port entire, or for any future docks, at a fair consideration.

When therefore they commenced building their second dock, Thomas requested to have his right respected. But this being refused, he filed a bill to obtain an injunction against their using his bilge levers in a second dock. The application was heard before Judge Thompson, when, to the surprise of all Thomas' fellow labourers in the dock, the cashier of the company swore that he had invented the bilge levers himself. Thomas denies that he ever had the least intimation from him on the subject. His affidavit to this effect was offered, but refused as that of a party interested. Probably the judge denied the injunction in consequence of a rule he had made to have the right first tried at common law. The end is not yet.

The attempt to negotiate with Mr. Weeks for another of Thomas' inventions, for which the Navy Department paid him a considerable price, was in the common course of business. I never proposed the sum mentioned, but some reasonable one.

dlesex, then in my care, and I was at that period in advance of him *in observation*, having had opportunity to see most of the celebrated canals in Europe. From that time our acquaintance has matured to friendship, and as a proof of it, he sought me out to substitute my services for his own in making the preliminary investigations for the Hudson and Delaware Canal. My report was approbated by him and printed, and may have promoted the formation of the company in New-York, which has just achieved a work, excelled in magnitude and importance only by Erie Canal, nor even there in some of the bold and correct structures which do honour to the engineers and to the directors. They deserved, and have received, a peculiar mark of legislative confidence. Had my health permitted of spending the summer months in the southern states, I should not have resigned that peculiarly honourable station.

Besides, *is it certain* that I am *now* at variance with the *present opinions* of those gentlemen? For, *since* their opinion as to the sufficiency of Lake Hopatcong to supply Morris Canal was expressed, the investigations I have described in my report by Mr. Bates, at the request of the Ohio Commissioners, were made. The indispensable supply of water to canals in our climate, was not practically known to either of those gentlemen with perfect accuracy. In fact, the United States engineers approached the subject with great caution, and were sustained only by accredited *theories*, as was Mr. Renwick. Nor do we learn by Judge Wright's letter to the commissioners, *what* waters were *shown* him on the route by Major Beach!

But Mr. Colden, in expression of his enmity, draws a new and arbitrary conclusion, considering the facility of travelling, and the migratory spirit that pervades our country, that I should have been employed on the great works of Massachusetts, if I had been an engineer of respectable talents. What great works? But even if there were such, *I may not prefer* employment there; I may prefer New-Jersey. May I not possibly discern in your state great opportunities of usefulness; in making rail-roads, for example? Or may I not have been regularly invited by the Society to their service?

5th. Mr. Colden, of *all men*, should not deem a steam-boat misfortune a subject of reprobation.

The facts alluded to were, that an association of gentlemen in Connecticut agreed to build with me a steam-boat. They the hull—I the engine. They enlarged the vessel after the engine was planned: the result was not fortunate. We amicably agreed—they to take back the hull, and I the engine. I then built a suitable hull at Boston, made the passage in her myself to Charleston, South Carolina, where she operated well in towing loaded boats up the rapid Santee to Columbia, during the winter. On her last trip she got ashore in a gale, and was damaged, as the captain informed me, too much to proceed. She was too much injured to be refitted there—came north, and was sold; it may be, as Mr. Colden says, “for old iron.” And what then?

6th. Mr. Colden would ridicule my enthusiasm for mechanical improvements, in that it has been said I own 40 or 50 patents. It is not to be denied, that I have sported with a few hundred dollars in aiding others, and in securing the right to improvements in the mechanical means of executing some branches

Mr. Colden's conscience whispers him that I volunteered to assist you : but surely he is mistaken. But I am yet to learn by what provision of the Morris Canal act, I am to ask permission of its worthy president *where* I may pursue *my own* business.

I feel great reluctance to making this letter so often border on egotism. My self-defence is, however, so connected with points that regard one or the other corporation, that it may be less unacceptable and more excusable. Mr. Colden's broad accusation, that I have *habitually obtruded* myself into public enterprises, is altogether unfounded and impossible. The instances he pretends to give this appearance to, are shown in the Note to be very different; that which he considers so in relation to the Morris Canal was *a proposition of business in my right alone to execute*. Its explanation may interest the stockholders enough to warrant a brief narrative, especially as they may see in it none of those marks of *hostility* to their success which Mr. Colden's prejudice discovers.

My avocations have happened to lead me to understand the Morris Canal project from its origin. The State's commissioners invited me to meet them at Morristown. I went in order to explain, and recommend Dearborn's perpendicular lift, the most complete improvement of modern times, perfectly adapted to this singularly elevated route. I do not think the commissioners or engineers, in preferring the inclined plane, could have understood it thoroughly. I had the honour of being included in the legislature's vote of thanks to the engineers, without rendering the State any other service. I know that I am right in saying that the whole success of Morris Canal, as then planned and since executed, depends on the *Lehigh Coal Mines*, over which the company has no control.

The next year the Board of Engineers, to which I belonged, was, on the application of the commissioners for the Raritan and Delaware Canal, (1824,) ordered to view this route, and report on its practicability. We found the streams on the line surveyed inadequate to its supply, and decided the important point, that a feeder from the Delaware would be necessary. We ascertained that the feeder would reach above twenty miles towards the Lehigh.

In their report, the commissioners, men of the first intelligence, (L. Q. C. Elmer, the late Dr. Holcombe, and the late Col. Kean,) compare the

of my profession. But did not Mr. Watt, Mr. Whittemore, Mr. Whitney, and even Mr. Fulton, invent? If I had been the owner of 100 patents—what then? But Mr. Colden's *irony* on this subject has some point; my 100 patents may be of no value, for among them all there was not found that *one* worth *a thousand*, the *perpetual motion*—for Mr. Colden himself has the reputation of this great discovery.

In the thousand transactions I have had, it seems these are all that Mr. Colden's good will could muster up in which a difference or a litigation arose. I could not myself indeed furnish him with many more. They prove that, like others, I have in my course of affairs, met with some perverse and unjust men; and some future Colden may add to the list of cases the present.

Raritan with the Morris Canal route *then in debate* and contemplation, and make the distance about the same to New-York, but the practical time in passing the elevation of the latter, equal to an increase of 66 miles if locks are used, and something possibly less, if inclined planes are as successful as the projectors then hoped. They annex a letter of the managers of the Lehigh Coal Mines, Messrs. White and Hazard, who express decidedly the opinion that the Raritan Canal route would afford them the cheapest access to the New-York market. The Morris Canal law passed soon after this, December 31, 1824. The banking privilege filled the stock.

The Raritan Canal subject was next year revived. Petitioners obtained an act of incorporation conditionally, that Pennsylvania should consent to allow the waters of the Delaware to be used. The company were to pay a bonus of one hundred thousand dollars. That State consented; but, among other conditions, prescribed that the feeder should be extended almost up to the Lehigh. The other conditions amounted to refusal. Pennsylvania intended *then* probably to make the canal on their side the river. They have done so; and the work is in great forwardness from the Lehigh to tide. It passes in sight of Trenton, and affords a stronger inducement than ever to make the Raritan canal, because the *feeder of it* may connect with the Pennsylvania Canal, and thus afford a continuity of canal navigation from Mauch Chunk, *descending* the whole distance to the tide at New-Brunswick, whence, if the boats are decked, steam tow boats will convey them to New-York. Another reason is, that the Raritan Canal may be connected by an aqueduct with that of Pennsylvania, which will probably be prolonged to Philadelphia. The convention between the two States made in 1782 will probably be superseded by a new one adapted to the present state of things.

Few things in human affairs are more certain than that the Raritan Canal will soon be made. Public convenience has long demanded it; and the financial interest of the State responds to the call of the nation. Lately a numerous meeting at Princeton has been assembled to recommend it to the legislature. All this ill accords with Mr. Colden's assurance in his official report of 30th April, 1827:—"It is *hardly possible* that any canal can be opened which will come in competition with the one we are executing."

There will then undoubtedly be a Delaware and Raritan Canal.—Now as the managers of the mines say it will be the cheapest route to market, the *question* is obvious—Does Morris Canal depend for revenue principally on Lehigh coal? I give in answer a quotation from the United States engineer's report, page 10.

"The principal article transported upon the canal will be coal from the Lehigh for the supply of the city of New-York. That city and the village of Brooklyn contains 135,000 inhabitants; but the only means of approximating to the consumption of coal by this population, is, by comparing it with other cities in a similar climate, where coal is the principal fuel.

Dublin contains,	144,000 people :	its annual consumption of coal is	204,000
Edinburgh and Leith,	100,000	" " " "	213,000
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	244,000		417,000

" This gives to each inhabitant a mean annual consumption of 1 ton $\frac{713}{1000}$, and for 135,000 inhabitants, 231,255 tons.

" But as the Lehigh anthracite contains about twice the principal of combustion, as the coal in use in the cities we have chosen for comparison contain, we will reduce the quantity found above one half—that is to 115,627 tons for the city of New-York—Toll \$109,845
They then add 40,500 tons for forges of Morris County, 24,300
36,375 tons for forges extinct, 21,825
40,000 tons for villages, 24,000

Tons	232,502		\$179,970
various tonnage,	58,220	Toll	34,301
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	290,722		\$214,271

It is obvious that this revenue is based on the supposition of *six times* as much coal as the mines as yet annually furnish, and that all other articles are estimated at 34,000. If then the Morris Canal is deprived of the Lehigh coal, and has to pay 20,000 annually out of 34,000 for management and repairs, it will have but 14,000 left, which is about 1 per cent. on the cost.

What, then, was *the proposition* which so much affronted the President of the Company? It seemed to me, for the reasons I have now given that before Morris Canal can be finished, there will be a Raritan and Delaware Canal, and its object be frustrated by this work and the unexpected event of the Pennsylvania Canal to the Lehigh. That there could be no other remedy for this misfortune but to seek out a cheaper source of supply, I had ascertained that the ground from the summit level of the canal to the water gap, 30 miles, was uncommonly favourable, and we all know that a line of rail-road had been projected and incorporated in Pennsylvania to bring coal from the Lachawanooh, near the Susquehannah, to the water-gap; therefore to meet that line would open a communication with that river on the most direct course, as well as to beds of coal rising above ground of superior quality to the Lehigh, being lighter and freer to burn, and more suitable to furnaces and to grates—27 miles nigher to New-York than the Lehigh mines are by the Morris Canal western section; and this 30 miles I had no doubt, being so comparatively level, could be made for as little money as the 15 mile rail-way of the Hudson and Delaware Canal. Therefore, having in my hands the improvement deemed the most economical form of rail-road that has been invented, it was *rather excusable* that I should have offered it to the consideration of the Board of Directors of Morris Canal, notwithstanding I rather expected at the time, *from Mr. Colden*, a negative at all events. He no doubt felt then, as he expresses himself now in his pamphlet, "I hope we shall persist in our determination to have nothing to do with Mr. Sullivan and his project on any terms."

Their rejection of my offer was *for me* a fortunate circumstance, as since that time the counties of Warren and Sussex, and Orange in New-York, have become aware of the vast importance to that rich and isolated part of the State to have a cheap, direct *winter and early spring* communication with the city of New-York; and the centre of Morris County being disappointed of the accommodation expected originally from the canal, will hail, as a propitious event, the suggestion of a rail-road, which, by its extent and connexions, will be sure to command any requisite amount of capital. Besides the moment this work is granted by the legislature, it will be the signal for filling the stock of the company for the Pennsylvania section in Philadelphia; for which section of the line, the surveys on the route I have described in my report, are this summer making. Wherefore I shall continue to promote the enterprise of Warren, and Sussex, and Orange, where a decided preference of railway to canal has (since that attempt at negotiation) been manifested.

Orange has had their law altered, and the other counties will follow the example, and by a branch from their line north and south or eastward to the Hudson, through the centre of Morris county, and through Paterson to Hoboken. Essex and Bergen will have also an interest therein; and a much better reason can be given why this undertaking should have *the encouragement of a bank charter* than any other—for it will be a new work, a winter accommodation for half the State to the best market for iron, for flour, and for produce, small and great.—New-York being the commercial capital practically of New-Jersey, is continually demanding more and more bank capital to facilitate its commerce, in which New-Jersey is interested; and what natural or reasonable objection can there be to *her* supplying a part of this active capital? A charter of one State is in law as good as one granted by another; and on the Hudson will embody capital readily, whichever side the law emanates.

This line of rail-way will do all and more than the Morris Canal was ever expected to effect. It will cost about one third per mile as much. It will afford to carry at one fourth as much. It will operate as well in the winter as the summer months, when conveyance is in fact *most* wanted in the country, and most impeded by our ameliorating climate. It will disturb none of the mills, but give augmented value to them every where near. Indeed branches may be made from the rail-road where no branch from a canal would be practicable. (*See Postscript.*)

The recent improvement in railway carriages, patented to Ross Winans, Esq., (and in my hands as his agent,) is one of the most simple and useful of modern inventions. It applies the power of the horse as he moves forward to the working of compound leverage, in relief of the friction at the bearing axles. Mr. Colden may not understand this description, but I can assure him it has been demonstrated to many men of science in Sussex and Orange, that one horse will draw on these cars four times as much as one usually draws on the best rail-ways in England, viz. 40 instead of 10 tons. This improvement was alone wanting to give to rail-roads the most decided advantage over canals, for locomotive engines may be applied also to this improvement.

I regret, therefore, that the President of Morris Canal should have expressed so decided an opinion against this improvement *before he knew what it was*, and against rail-roads in favour of canals, in which he is at variance with experience in Great Britain, as well as the scientific treatise of *Wood* on rail-roads, and all who read him, as a second edition enlarged, with the more recent steps in the art, is announced as about to appear from the London press. Tredgold too, if my memory serves, states the expense of carrying per ton per mile on rail-roads to be one farthing, equal to half a cent. What a pity then that the Morris Canal route had not been occupied with a rail-way. The ground was really well adapted to it; then the Musconetcong millers, and the Passaic manufacturers, might have dwelt in peace "under their own vine and fig tree, their natural and lawful privileges, with none to make them afraid."

Before, therefore, quitting the subject of the *rejected proposition*, it is in my *justification* proper to remark further, that it was made on the supposition that *the object* of the western section of the canal, 42 miles, now half done, was in fact about to be snatched away, and that it was expedient for a prudent direction to substitute another, which, by a modification of the law of incorporation, might be made effectual to secure the bank privilege, and make the *middle, and perhaps southern sections, good property*, with no more money than it would require, unavailingly, to finish the western section. The canal would have had a great and cheap supply of coal, distant 14 miles by tide, 44 miles by canal, and 30 miles by rail-way, and 45 miles by rail-way in Pennsylvania; while Hudson and Delaware Canal has 100 miles by tide, 106 by canal, and 15 by rail-way—133 to 221.

Since that proposition was made, it appears that it would have been *fortunate* for the Morris Canal Company to have fallen in with it, because I have demonstrated in my report that Lake Hopatcong does not supply water enough for the western section alone, (with all the brooks besides,) and that if *restrained*, as no doubt the company will be, to the use of the lake waters, they will have the choice of filling the western section alone, or the middle section alone. *The proposition then turns out to have been of much more importance to the Morris Canal Company, than I was myself aware of at the time.*

As to Water. The question whether Lake Hopatcong supplies a sufficient quantity for the whole length of the canal, is, in every point of view, of the greatest moment. This was the main topic of my report; I must refer the reader to it for the details of computation. I intended they should be fair and liberal—taking the acknowledged experience of Erie Canal as the best guide. The "Answer" calls for further elucidation of the subject.

Professor Renwick computed the discharge *in a year* from the lake at 54 millions of cubic yards. This for seven months is about 31 millions. He also stated that in September, 1822, he found the lake had fallen five feet below the top of the old dam, which is ten feet below the top of the new one. That in September, 1823, it had fallen three feet below the

top of the old dam; equal to eight feet below the top of the present dam. And I have been informed by the inhabitants, that they have known it fall so much that the forge at the outlet could not work.

That the lake is subject in our hot summers to get very low, is a *fact* corroborated by my own observation this summer, which has been unusually wet; for I found the whole discharge in June to be but at the rate of 17 millions in seven months. And as the discharge in September, 1823, may be computed at 10 millions, the mean of these sums, 13, may be the fair summer discharge.

To account also for this unexpected paucity, I entered at some length in my report into the subject of reservoirs, to show, from European experience, that a moderate increase of depth, and a great extension of surface, had in this instance wasted by evaporation more water than was saved—if any could be saved with constant drawing. In Mr. Colden's "Answer" he revolts at this idea, and denies that the flowing is shallow, or so little as a thousand acres. The president calls it, I believe, 3000; I took my idea of it from Mr. Renwick's report.

Certain it is at the lower end of the lake, about a mile square was originally meadow land. At the northeastern extremity there was an extensive tract of low ground, perhaps three miles by one mile, not more than two or three feet above the surface of the lake, as it *first* flowed. This and various tracts of swamp, I am informed by an inhabitant, has been laid under water by the raising the new dam five feet higher than the old one. Whether or not the flowing is *shallow*, which Mr. Colden denies, the Board of Directors must settle in their own way from this fact.

Having, on the one hand, no disposition to depreciate the value of the lake nor the canal: so, on the other, I do not choose to be misrepresented on this subject. Mr. Colden, page 27, asserts that I say in my report, page 48, that the lake may be raised three, six, or nine feet more, without much extension of surface; but what I said was "probably the lake has been raised just enough to cover, a foot or two deep, the extensive low grounds up to the foot of the high lands, and might be raised three, six, or nine feet more, without much extension of surface. This might be early ascertained by running lines of level from the edge of the water where such increase would affect property, and where the shores are comparatively flat. *Whether it would fill* might be determined by measuring the *inlets* of water at the more copious seasons."

In fact, it is very doubtful whether it would fill, because the surrounding hills are of very moderate height, and not to be compared, as he says, with the highlands of the Hudson. It should be recollected that the surface of the lake is 900 feet above the sea; nor is there more than one inward stream of magnitude enough for mills. I have since my report been so informed, and that the lake cannot be raised without overflowing the Hamburg turnpike, and more low ground.

Nevertheless, Mr. Colden insists "that Professor Renwick was right in his estimate, that the supply from the lake, before it was raised by the dam, would be three times what the canal would require, that, now when the volume of water is so much increased by the dam, the lake will afford much more than five times the quantity."

We must reason from facts, when we have them, and not substitute theories and assertions. It is obvious that Professor Renwick's computation was for the whole year; and surely the winter's water that is past, has no more to do with the *ensuing summer*, than has the water of five years past. Since that time we know, what Mr. Renwick did not then know, the demand on Erie Canal. Had it then been known, I doubt not he would have been governed by it, as a result characteristic of our climate.

Besides the Musconetcong mill owners have *never believed* in the company's assurances, now reiterated, that "Nothing can be more certain than that the water powers in the streams west of the summit will be improved. That the lake will be a *reservoir* to supply them in the dry seasons, and that they will receive more water from it than they ever have done in those seasons."

But what have they always answered? The reservoir is *for the canal* in dry seasons. How can it be for us too? You must first prove that it is enough for the canal, and *more than enough* for it. Our supply must, of course, be *secondary* to that of the canal! The mill owners on this stream, several of whom I know have never been deceived or deceived themselves in regard to the effect of the canal. And if they had hoped the best results, the effect of stopping the discharge from the lake, while the dam was building, would have, and did awaken, their attention to the subject before mine was called to this investigation. They would be exceeding glad to have the company make good their assurances, as would the Society.

Let us examine the probability of it. Mr. Colden says, page 25, "Circumstances have enabled us to ascertain, in the most satisfactory manner, the sufficiency of the supply of water which will be afforded by the Hopatcong lake since the dam at the outlet has been raised.—One of the gates of the lock at the dam became deranged in the course of the last winter; it was desirable to draw off the waters of the lake some feet, and as low as the old dam, to repair the lock. To accomplish this, the waste gate at the dam was hoisted early in June last, and has since been kept open, except when it was occasionally shut for a short time to accommodate the forges and works below. Probably it was on one of these occasions that Mr. Sullivan found, as he says, all the gates shut on the 16th of June last, when he measured the waters: that is, he made his measurement after there had been a discharge from the waste gate for about a fortnight."

Is Mr. Colden willing then to say that after the waste gate had been open a fortnight, the discharge was reduced to what I found it on the 16th of June? Indeed to still less; for the truth was, that at the time I was there *the mills belonging to the company were undergoing repairs*, and all the gates had been shut down for the accommodation of the workmen for more than a week, as I understood. If the gate had just been shut down, the lake would have been rising; and continuing shut down, would have continued to rise. But I returned a week later—the work was still going on, the gates all continued shut down, and there *was not half the water running over the dam as before*. I remarked on it to the gentleman having care of the place.

But I proceed with the "Circumstances."

"But it may be assumed that the waste gate has been constantly open as long as from the 1st of July last. The gate was raised 22 inches; its horizontal length is three feet, and from the bottom of the waste gate to the top of the dam is 10 feet. It was expected that this would draw off the water as much as was required; but on the 31st July it was found that the lake was not perceptibly lowered. On that day one of the paddle or valve gates of the lock was opened, and from that time to the 15th of August, the water was discharged, both from the waste gate and one of the valve gates, but the water in the lake was not found to be reduced more than *ten inches* at the last mentioned date.

"The other paddle gate was then opened, and both paddle gates and the waste gate were kept constantly open until the 19th of September, when it was found that the water had fallen *only three feet eight inches*."

"Each paddle gate is 20 inches high by 22 inches wide, and the top of the gate is 14 feet from the top of the dam.

"Notwithstanding this immense discharge for so long a time, the water, on the 19th of September last, stood in the lake six feet four inches above top water in the canal, or ten feet ten inches above canal bottom."

"These facts I state from a letter of the chief engineer, Major Beach, written by him in answer to a letter requesting correct information on this subject, and they are corroborated by the certificates of several persons who have had an opportunity of being acquainted with them."

Page 27. "When it is seen that such constant and copious discharges in the driest season affect the waters in the lake so inconsiderably, and leave such a superabundance, can it be doubted but that Professor Renwick was right in his estimate, that the supply from the lake, before it was raised by the dam, would be three times what the canal would require, or that now, when the volume of water is so much increased by the dam, the lake will afford much more than five times the necessary quantity. Mr. Sullivan's representations, therefore, that the canal will interfere with the Paterson works, are either pretended or chimerical. And his attempt to alarm the mill owners in the Musconetcong, are as groundless as they are malicious and mischievous. Nothing can be more certain than that the water powers in the streams west of the summit level will be improved; that the lake will be a reservoir to supply them in the dry seasons, and that they will receive more water from it than they ever have done in those seasons."

These quotations are thus given at full length, as my readers may not have [all of them] Mr. Colden's answer to my report at hand.

The question might be asked, which is the most "mischievous" thing, to *demonstrate the fact*, that the lake water is *not* sufficient for Morris Canal, even if taken wholly from the mill owners; or, to deprive them of their water power without means of compensation? If to speak the *plain truth* belonging to the investigation be "malicious," I must e'en bear the imputation—which, indeed, carries its own contradiction. If the company mean to do justice, when its measure is ascertained, it is no injury to them to say, what all know, that those claims are not settled. It would have been malicious or ungenerous on my part, towards

the mill owners, to lend myself, incidentally, to premeditated injustice by hiding any fact interesting to them to know, lest it should displease the President of Morris Canal. Besides, who are the mill owners, that I should awaken *their* alarm? They are lawyers, merchants, manufacturers, and other people of the first intelligence. Do they need to be told their rights? They have not been asleep, but awake, to their interests from the beginning of this enterprise.

Let us however proceed to examine the value of the important "Circumstances" with which the President of the Company and its engineer have furnished us; and on which the former (the latter being too prudent) now founds and asserts the *five fold sufficiency of the lake*, to prove that my representations of danger to the Society have been "pretended or chimerical."

I will first remark, as a "circumstance" not material, though striking, that I was at the lake (in company with Mr. Freeman) on the 2d of last September; that the *waste gate* was not *then* open, but the two paddle gates were. This was the second day of a very heavy rain. We found the surface of the water reduced below the top of the dam two feet five inches. On my way up, hearing that the pond had been drawing down for three weeks past, I was curious to know how large an opening, and under what head it had been reduced so much below the dam, and therefore measured the depth of water in the lock at the paddle gates, and their size. The depth in the lock was 12 feet; from this I deduct 12 inches for the sill of the great gate in which the paddle gate is placed; two inches for the space below it, and 10 inches to the centre of opening, makes the head 10 feet. The area of opening, deducting for the thickness of the pivot gate two inches, is 20 by 20 inches, or $f2.80$. The velocity of the water under that head, by the established rule, is $f25.35$, less $\frac{1.8}{100}$ ths for contraction, and per second discharges 58. $\frac{20}{100}$ cubic feet—both gates, 116.40.

You will please to remark that this discharge was drawing the pond down; but suppose it could have sustained this discharge, how many miles of the canal would it supply according to experience on Erie Canal? Multiply 116.40. by 60, gives 6,984 feet per minute. This divided by 158.75, gives 44 *miles of canal*, which these two gates would have kept supplied, the same head continuing.

But Mr. Colden informs us the waste gate was also discharging. Let us compute the length of canal which the "immense discharge" of all the gates would supply.

First. Let us examine what discharge left "no perceptible" diminution after running all the month of July; for this may possibly be supposed the mean of all the months of a favourable summer. This was the waste gate alone: the dimensions and head of water are above 3 feet by 22 inches, gives an orifice of 5 feet 6 inches. The head of water above its centre, 9 feet 1 inch, will afford a net velocity of $f19.83$. per second, which is 109.07. cubic feet per second, and sufficient only for $41\frac{1}{2}$ *miles of Morris Canal*.

On opening additionally one paddle gate for 15 days, the lake was drawn down 10 inches; and on opening the second, it was reduced, it seems, *and is well attested*, (only) 3 feet 8 inches. The *reservoir* then is "chimerical."

We now compute what quantity of water was discharging when the lake was thus reduced, and which would continue to reduce it still more.

First. What head of water have we now at the waste gate? 9 feet, less 3f. 8. is 5f. 4. The area of gate, 5f. 6. The net velocity is 15. 17 = per sec. 83. 43

The area of the two paddle gates, ea. 2. 80. = 5. 60. " " " 84. 95

per second, 168. 38

What length of canal would *this quantity* supply, could it be constant?

The plain answer is $63\frac{2}{3}$ miles.

There can then be no reservoir. *The idea of making a reservoir of the lake is "chimerical."*

But Mr. Colden says Mr. Renwick's computation was right. For the whole year it was 54 millions of cubic yards, which for *seven months* is 31 millions. How does he prove it *right* by any thing he has asserted? Yet my calculation may tend to prove it *both* right and wrong; for as 168.38. cubic feet per second, amounts in 214 days to 115 millions, 306 thousand, 629 cubic yards, and is nearly four times as much as his computation, it follows that the discharge from the lake, which would sustain $63\frac{2}{3}$ miles, ought, according to Mr. Renwick, to draw the *reservoir lake down*; and, therefore, he was *right* in not making his estimate greater—but wrong in the estimate of its sufficiency for the canal, because *three times as much sustains but a less number of miles*.

Now, as the preceding calculation of the discharge from the lake is founded on Mr. Colden's vaunted premises, and without any deduction for the Musconetcong mills, the people there would be glad to see how he will answer the question, How those mill owners are to have *more water power* than ever? Since he deprives them of the whole, and since 'tis evident there can be no reservoir, they must think the president of the canal means to add *derision* to injury.

It is also stated, that on leaving off the attempt to draw down the lake any lower, there still remained a depth of six feet four inches above top water in the canal. It is not, however, mentioned, that this depth is owing to the situation of the new dam in the low space behind the old one: nor, that between the dam and the natural outlet of the lake, was a meadow of a mile in extent nearly; so that the water would very soon have had to take its old, natural, serpentine, shallow course. I think it was a great fault, not to have made a deep straight channel from some little distance within the lake down to the lock. It is now too late.

It is also remarkable, that while asking such information of the chief engineer, the president did not also ask this plain computation of quantity. I have no doubt, as civil engineering is an art founded in the exact sciences, Major Beach would have given the same results.

It will be evident to every competent mind, that I did not exaggerate the requisition of water for canals, nor misrepresent Mr. Renwick's meaning in his computation, as is intimated in the "Answer;" pages 24, 25, &c.

His plan of computing the water, in reference to the supply of the

canal, was not that which ascertains the *minimum*, but the *maximum*. Professor Renwick's report was, it is true, dated the 5th October, 1823. But he is not explicit as to date of operation, nor need to have been on his plan. Page 6, He says, "To ascertain the quantity of water that passes at this point, (on Musconetcong River about a mile below its rise in Lake Hopatcong,) the whole of which might, if needed, be made disposable, the several gates of the work were measured with the head of water pressing upon each of them, and the number of hours per day, and days per year, for which they are opened, ascertained from the best authority." And his calculation resulted in giving 54 millions of cubic yards as the discharge in *twelve months*.

He also said, "It was found that, in addition to the water actually employed in the works, or discharged by the waste gates, there was a considerable leakage constantly going on through the dam; it was also represented to me, that, for six weeks in the spring, at the time of the melting of the snows, the waste was much greater than indicated in the calculation."

Now it is self-evident that Mr. Renwick did not mean to say that the freshets of the spring, nor the water which passed in the winter months, was applicable to the canal, for this would have been absurd; but "that the supply will far exceed any demand that the canal can ever have upon it." This he satisfied himself of by calculations, which later experience has shown to have been without due allowance for our climate on canals and reservoirs.

Mr. Renwick, in the same report, mentions the diminution of the lake water two successive summers, 1822 and '23, but does not *qualify his computation of the discharge accordingly*. He did not show the *minimum* discharge in September expressly. Nor was it to be inferred from his table of gates.

But he now says in his letter of the 3d October, 1828, given in the appendix of the "Answer"—"The number of hours and days in the year in which the gates were opened, was obtained from the proprietor of the works, a gentleman of much intelligence and unquestionable accuracy." The sum of 54 millions of cubic yards, therefore, exhibits the whole quantity that passes the gates in a twelvemonth.

"But from it may, at the same time, be gained the daily supply at seasons of the greatest drought, for, with the exception of gate No. 3, all the others were in daily use, even in the month of September, 1822."

Let us now try it by this rule, and on this estimation. Gate No. 3 was estimated at 19,384,242, which, deducted from 54,021,991, leaves 34,637,749 for the year. Now, unquestionably, Mr. Renwick will allow me to deduct $\frac{5}{12}$ ths from this sum, supposing the canal to operate seven months, which leaves 20,205,353 cubic yards for the minimum. Then, as Mr. Renwick computed, the requisite quantity for the canal then expected to be 76 miles in length, at 17,034,227, he now very consistently says in his late letter, "With proper care in the construction of the canal, I am satisfied that it will be found sufficient."

Mr. Colden's illiberality at page 25, is thus answered by Mr. Renwick himself.

And I maintain, from my own remarks, and the experience on reser-

voirs in Europe, and the known results of experiment, that it will not be found of any material advantage to have raised, and, at the same time, spread the lake. Therefore, it was not from want of candour that I omitted to mention, that his computations were made before the dam was raised, for Mr. Colden has himself failed to prove, that it was raised to any good purpose; and it is my belief, that the plan of proceeding was wrong in principle, and that no European engineer, having opportunity of observation on reservoirs, would have ventured to *spread* so much, so small a quantity of water as is discharged.

There are, indeed, hills along the sides of the lake:—but no more to be compared with the bold scenery of the highlands, as he says, than the 3000 acres of swamp already flowered, are in depth to Ontario.

Page 25. of the answer—"Can Mr. Sullivan flatter himself that the company or the public will place more confidence in his opinion than the Legislature of New-Jersey? and the company have, in those distinguished men above named, under whose auspices the charter was granted, and more than 750,000 dollars has been expended on the work," &c.

The reply to this is, that the sum expended may have been wasted; and I have good reason to expect, without any self-flattery, that the public will have confidence in later results of experience in canalling, than *were known* to those distinguished men; and that the stockholders will not shut their eyes, as Mr. Colden does, to the light of the truth: and that the legislature *will* advert to the report on which the charter was granted.

But to show the public that I am not alone in opinion against what that of those gentlemen was, but not against them, now that the consumption of water on Erie is known, in this hot and dry clime, I shall ask permission to give a letter on this subject, (see appendix,) from another officer in the United States corps of engineers. His opinion is equal in weight to that of those distinguished men, and confirms mine.

Mr. Colden will not doubt *now*, that I am serious, in my belief that the canal, if it is to be supplied from the waters of the Passaic, *will interfere fatally* with the manufactories of Paterson.

Our climate is peculiarly liable to *hot summers and long droughts*. The diminution of our rivers at that season, from one extremity of our country to the other, is often a distressing cause of interruption of navigation and of mills. There is no part of Europe so unfavourable to canals, for this reason, as the United States—none, where the supply of water will be so precarious. It was the wide spread branches, the ponds and valleys, where reservoirs might be made, that recommended the Passaic, more than its sometimes great volume of water, and as much as the elevation of its falls.

I am also the more serious and confirmed in my opinion, from what Mr. Colden has stated, that the manufactories of Paterson can spare no water to the canal. By measuring, in August and September, after a spell of warm and dry weather this summer, the whole of what passed the falls, and what was led to the factories, I am convinced that the whole would not have supported more than 40 miles of Morris Canal.

The distance from Dover to Newark is 44 miles. If the pretensions of the Morris Canal Company are sustained in law, the manufactories of Paterson will be destroyed.

Having thus shown *one of the reasons why* the Morris Canal Company have laid a plan of encroachment on the waters of the Passaic, notwithstanding their *affected confidence* of possessing in the lake a source *five-fold sufficient*, I have now to present *their other reason*.

In 1826, the same Mr. M'Culloch, who had, in 1823, officiated as president of the State's Commissioners, being now a director, was president of a canal *commission*; and as he made, in this capacity, the *annual report*, usually made by the president of the company, I did, in quoting from it, call him so, it is true, and committed this great mistake. But not, as Mr. Colden says, (page 18.) "to show that *the President* of the Company *has recommended* that the company should, in violation of their charter, use the surplus waters of the canal for milling purposes:" but that it was *the settled scheme, and plan, and purpose of the company to do so*, intending to obtain an alteration in the law, perhaps, to that end. This I shall prove, as far as official declarations and coincidences are evidence.

To cast some obloquy, Mr. Colden says, that I must have known that Mr. M'Culloch's *printed report*, as the officer qualified and appointed to make it, had, *after printing, been disapproved and suppressed*. The first intimation of this uncommon occurrence, comes to me now for the first time from his letter. Nor did he himself know of the occurrence till he made inquiry, it seems. The pamphlet I used, came to my hands from the officers of the society, with various others; and so far from being *suppressed*, I find myself in possession of four copies, and have seen the same edition in the hands of several persons at Trenton and at Brunswick; and my inquiries now for one of the *New-York edition* have not been successful, and I am not even able, for the want of it, to decide *how much* was intended to have been suppressed.

The circumstance of its being printed at Morristown, where Mr. M'Culloch resides, was so natural, that to have imagined that an *annual report* had been *first printed, and then suppressed*, could have sprung only from a degree of suspicion utterly at variance with my character, and contrary to the experience of twenty years in business with corporate bodies. Nor could I have imagined, that one from the frank and fair mind of Mr. M'Culloch, would have *needed to be suppressed* by an equally fair minded direction. Had both been before me, I should not have been able to decide which was to be considered "genuine." I should naturally have presumed that to be intended for circulation which contained most information.

It is now said to have been suppressed. But as there may have been *ample time* between the *printing*, and the fear that it might unveil the purposes of the company too far, Mr. M'Culloch, not expecting disapproval, might have circulated them a little around him, in the country, a few hundred copies perhaps. It is justifiable, therefore, to consider it not suppressed, but *as intended to have been, too late*. More especially, as the reason Mr. Colden gives for it, is *too delicate* and sentimental for this corporate body to have felt.—"That these passages gave the appear-

ance of the company's being dissatisfied with the charter, and their being desirous of having further privileges than those which had been granted to them."

To weigh, justly, the force of this reason—this respect for *appearances* in the eyes of the legislature—this apprehension lest that body should think the company dissatisfied, whom to satisfy they had done so much, or desirous of more privileges, which, however unreasonable, is not criminal, nor even prejudicial, as all are supposed to desire all that the wisdom of that body will grant, it is necessary to see to what it applied, and what the meaning of the officer was who made the report, and who, understanding the views of the company, spoke what he believed to be acceptable to them, and in accordance with their views;—for, if his testimony to those views, as to taking the Passaic waters, is corroborated by the *present pretensions* of the company to the waters of the Passaic, expressed by their *present* presiding officer, and by the actual construction of the canal in such manner as to accord with those views and with those pretensions, then it follows, that it was of no consequence whether the report was, or was not suppressed, as the *doings* of the company speak louder and more clearly than *words*; and as they must find themselves in the *dilemma* of confessing either the insufficiency of the lake waters, and therefore their encroachment on the Passaic waters; or that they encroach thereon either unnecessarily, or to use the water for milling purposes, when they shall have satisfied the legislature that they have a surplus so derived actually to use.

As the Morris Canal Company act *inconsistently*,—declaring that they have a *five-fold sufficiency* in the lake supply, yet with no authority in their law, break in upon the rights of another corporation, and, at all events, expose themselves to claims for needless and great damages, and give no reason for it better than that just quoted, which is none at all, we must seek the explanation which they themselves inadvertently, incidentally, and, therefore, unequivocally give. Such men as Mr. M'Culloch do not speak without a meaning. Let us hear what he says. His report is on every branch of the company's interest, and manifests the great reliance it had in his capacity.

To arrive regularly at that object, I must remind you, that at page 27 of my report on your concerns, it appeared to me tenable and correct to say, that the procuring Green Pond to be inadvertently given from the society to the company, was the beginning of a system of encroachment; and "that every branch of the Passaic might thus in succession be made tributary to the Morris Canal, and an immense mill-power be usurped from the waters of the society," and that "this supposition is, indeed, rendered historical intention, by the first annual report of the presiding officer of the company, Mr. M'Culloch." His not being president of the company, but of the commission, does not lessen the force of his testimony. In a court of law, his evidence would be as unexceptionable as Mr. Colden's own.

It may be inferred, from the following passage of Mr. M'Culloch's report, which may or may not have been amongst the intended suppressed passages, that some doubts had arisen amongst the stockholders, whether the lake would actually supply the canal? It also relates to the ground

at its terminations. It had been a question, it seems, whether the canal should enter the tide at Newark or at Elizabethtown? When this conspicuous officer observes, (16.) "the question, under all circumstances, perhaps, ought to hinge upon the influence which either town may acquire in our deliberations, by holding a large proportion of stock, or by transferring a liberal tract of land at a moderate price. It is high time that some final step be taken. The navigation from New-York to Dover should commence at latest within a year," &c. This quotation is merely to show how high, in the council of affairs, this gentleman was, and the design, even then, in the company, to use the Passaic waters from Dover, before the lake waters could be got there to be put in. The following quotations, preparatory of another topic, show how little Mr. Colden's accuracy can be relied on. He seems to have appropriated what I said of Mr. M'Culloch to himself, as presiding officer:—


Page 18. "The object of Mr. Sullivan is to show that the President of the Company has recommended that the company should, in violation of their charter, use the surplus waters of the canal for milling purposes. It will be seen in the sequel, that neither the president, nor Mr. M'Culloch, or any other member of the company, ever made any such suggestion."

In refutation of this pretence, I claim the right to quote Mr. M'Culloch himself—Report, page 17: "We have made for 15,000 dollars a most valuable acquisition of lands at Brooklyn, being the ground covered by the lake, with 100 acres of dry land, including forges, mills, farm, and wood land. This purchase gives entire control over all the operations of the summit level, besides affording a *manufacturing seat* of the highest value. In addition to this most valuable acquisition, the *water power created by the company, both at its inclined planes and upon situations where an unlimited command of surplus water is obtained*, are such, that in 20 years they may equal the revenue of the canal itself."

What does the reader think now of Mr. Colden's *accuracy*? What of the project of the company, on reading the following paragraph from page 17 again? "For want of rendering a superintendence over this species of property the duty of some particular officer of the company, it is reduced to a situation of some difficulty. We have located our inclined planes without attempting to secure the ground whereon the mill seats must be erected; we have led our canal over grounds of the most expensive character, blasting rocks and rearing aqueducts with no visible object but to form a chain of the finest water powers in New-Jersey; yet, with such important objects in full view, it is hardly credible that not a step has been taken to purchase the land, without which the whole operation becomes worthless. We have erected at our own expense a chain of several hundred mill seats, forgetting that the only soil on which these establishments can be reared, remains yet to be purchased. At the time when our charter was granted, some misapprehensions hindered the company from obtaining a right to lands of this description; and while the water belongs to the company, the soil on which it can be used remains in the hands of proprietors to whom it is worthless. Thus the State foregoes a vast accession to its manufacturing riches, the company cannot avail itself of a property which it has created, and the pro-

“ proprietors are deprived of the benefit accruing to their farms by the erection of manufacturing villages. Some attempt ought to be made under the trust clause of our charter to arrange this business with the landholders upon a liberal basis ; but should they extort and avail themselves of the vantage position in which they have been inadvertently placed, the evil may be remedied by applying to the legislature for leave to take, at a fair valuation, a narrow strip of ground at the indicated places.”

Can any one believe, however politic the suppression of this passage, had it been timely suppressed, that this was not the sentiment and purpose of the directors and the company to obtain leave to use what they call their surplus waters for milling and manufacturing purposes, and that the company encountered great unnecessary expense to lead the canal to elevated positions where they might not only erect their inclined planes, but create water power? If any should doubt it on account of the insufficiency of water from the lake, such doubts will vanish on reading another quotation from the same annual report, page 4 and 5—Mr. M'Cullock says,

“ I shall now solicit your attention to many topics worthy of notice. A false impression has arisen that the supply of water would be insufficient for our canal. The following statement must suffice to remove the fears of the most timid. Lake Hopatcong discharges itself through gates of fixed dimensions, and therefore its annual issue is capable of being ascertained with as much certainty and precision as a hogshead can be gauged. From a series of observations made by himself and the proprietor, Professor Renwick calculated the annual passage to be 55 millions of cubic yards of water—being above *four times* the quantity desired for the whole line from the Delaware to the Passaic. Nor is this all. The Green Pond could easily be made to reserve a large supply, which pond, as well as *Rockaway River, act as feeders*, and upon both the eastern and western section, numerous tributary rivulets contribute to the line.  All fears then of a scarcity of water must originate in want of information as to these points.”

Rockaway River is a principal branch of the Passaic. It is plain that Mr. M'Cullock did not in this passage expect to announce any thing new to the Board of Directors, but aims to give an assurance to those who had entertained a *false impression* of the sufficiency of the lake waters. And he informs them not only of the superabundance of this source, but of the intention to use Green Pond, the Rockaway River, and numerous tributary rivulets.

This being the same officer who, further on in his report, as already quoted, describes the valuable sites for manufacturing villages created by leading the canal to elevated positions, which we know occur after taking out the Passaic waters from the Rockaway at Dover, and at Powerville, there can be no doubt of his meaning; and there can be no reason to suppose he was alone in these views, being of the board, and as much in their “deliberations” on this as on other subjects. Mr. Colden not being then in office, cannot contradict Mr. M'Cullock, who was in office and confidence.

It is clear, then, that in 1826 the Morris Canal Company had formed a settled plan, not openly avowed as yet, to take possession of the waters

of the Passaic first, at Dover, and at Powerville, near Boontown, and generally; for we find also this language, "an improvement of Pompton river to Ramapo, and of the Passaic to Chatham, are objects which a few years may render subjects of serious deliberation."

Accordingly feeders have been surveyed and located to those places on the Pompton, and on the upper Passaic.

Thus, notwithstanding the company has *four or five times as much* water from the lake as their canal requires, as they assert, over and above what the Musconetcong mills require, they appear very early to have laid this deliberate plan of diverting the waters of the Passaic away from the manufactories at Paterson, and have actually constructed works to this end.

For what purpose subjecting themselves to the consequences? We have seen it already revealed, it may be inadvertently, but not therefore less truly, with a view to form sites for "manufacturing villages."

To confirm this design, we now find the company by their president, not indeed acknowledging that purpose, but openly and strenuously claiming to have more water than the canal requires, and therefore denying the *validity of the Society's charter to protect the waters*, on which the usefulness of that charter depends; and notwithstanding he asserts that the lake affords a *five-fold sufficiency*.

What, then, is their meaning? Why does the company, deficient in capital, and not denying the Society its rights as riparian owners, incur and expose themselves to such an immense claim for damages? What do they intend to do with all this volume of surplus waters? This question is answered at once on looking at Mr. M'Cullock's *exposé*. They must surely expect to derive from the *sale of water power* at the sites of their manufacturing villages, not only enough to pay for the ruin of Paterson, but to make *great profits*:—Or, it may be, that they do not expect to pay for these great injuries, being entrenched behind the rampart of their special and peculiar law. This covert, therefore, I must, by and by, reconnoitre. Certain it is, that if your charter were not in the way, (*hinc lacrimæ*,) they would assuredly, under their law, take possession of *all the head waters* of the Passaic, as they have of the Musconetcong, and form perhaps as many manufacturing villages as there are (or might be) inclined planes in 1700 feet rise and fall—that is, besides locks between the Delaware and the lake, 12; between the lake and Dover, 5; between Dover and Paterson, 6; between that level and tide, 3. Twenty-six manufacturing villages!! Magnificent! Magnanimous! *This then may possibly be the meaning* of the assurance to the Musconetcong and Pohatcong mill owners, that the milling power of *their* section of country shall be increased!

Mr. M'Cullock is a man of too much good sense and intelligence to be supposed to use language without meaning. I hope Mr. Colden, if he has any doubts, will ask him what he meant, speaking as a director to the whole board, by the words—"We have led our canal over grounds of the most expensive character, blasting rocks and rearing aqueducts, with no visible object but to form a chain of the finest *water powers* in New-Jersey; yet, with such important objects in full view, it is hardly credible that not a step has been taken to purchase the land, without which the whole operation becomes worthless."

I will, from what appears, venture a conjecture that he meant the directors had *become convinced* that the canal, which it was necessary to persevere in making to the Delaware, in order to acquire a legal title to their bank privilege, would not derive *much revenue* from the *coal trade*, and that it would therefore be *wise to create* sites for mills, trusting to the liberality of a future legislature, as he intimates, for a modification of the law to authorize mills. Or I will venture to think that he meant that the company, having, by the systematic measurement of the waters required and used by Erie Canal, made and published in 1824-5, discovered that the lake would be insufficient, came to the resolution to break in on the waters of the Passaic, and thus not only secure enough for the canal eastward, but a surplus for mills and manufactories; and thus liberating the lake from supplying further east than Dover, devote its waters to the supply of the western section, &c.

There can be no doubt the company is now acting in *entire consistency* with the scheme of aggrandizement formed in 1826, in claiming and pretending, as the president does, *that the Society has no right whatever to the waters of the Passaic under your charter.*

I must now ask leave, though not in the profession of law, and far from competent to do the subject justice, to endeavour to fathom the depth of Mr. Colden's meaning in the following passages of his "Answer"—pages 11 and 12.

"But this is one of the principal ostensible objects of Mr. Sullivan's pamphlet, that is to persuade the manufacturing Society that it has under its charter a right, not only to all the waters of the Passaic, but to all the waters of the Ramapough, the Pompton, the Rockaway, and every other river and stream which runs to the Passaic."

Is it not perfectly absurd to say, that I aimed to persuade you of that which, unless you had been persuaded of, there could have been no occasion for my services?

This passage has however a hidden purpose. He would have it supposed that your resistance to these encroachments are *but now beginning*. He would convey the impression that you have *thus far acquiesced in their aggressions*. And that your claim to these waters may seem to those not familiar with their situation, as not belonging to the stream on which the manufactories depend; but be it known these are the principal branches of the Passaic which come in *above the great falls*.

He needs not to be reminded of your earnest opposition and resistance to the encroachments of the Morris Canal Company, step by step, as they have advanced, and that you have delayed your application to the governor for an injunction against them, only in accordance with advice of your counsel, (Mr. Wall, Mr. Wood, and others,) till their intention should be undeniable, and manifest in plan, purpose, and effect.

To your letters and remonstrances against this scheme of aggrandizement, at the expense of the town and manufactories of Paterson, they have only answered, with an evasion insulting to common sense, We shall bring you from our lake reservoir more water than we shall take away. Why not then use the surplus themselves? Why not pour it in above the Dover pond, owned principally by one of the directors? They

said likewise to the Musconetcong mill owners, while cutting off the great source of their river, adding derision to injury, *We assure you we shall increase the water in your streams!* In common life we should call this *cajolery*; but here, I presume, it must be called *Morris Canal policy*.

Under this head too we must place the *artifice* of getting Green Pond given them in the bill, that under pretence of taking it they might take the whole of the Rockaway. But, let it not be forgotten, the bill in granting Green Pond did not grant leave to take *the Rockaway*. If the legislature conferred a right to the pond waters, the company must lead them to the canal by a feeder, ten miles through the mountains.

But the state cannot have constitutionally resumed this pond any more than the whole grant appropriating the Passaic waters to the manufactories. I need not refer Mr. Colden to such cases as the Dartmouth College, or the Saranac River grant.

The *intention* of the Morris Canal Company is now, at length, openly announced in their presiding officer's letter, in the following words from page 11, which follow the last quotation made:

"I will not believe that the directors and members of the manufacturing Society, (if there be any such directors and members,) will listen to so extravagant and absurd a proposition; for I undertake to say that the manufacturing Society has not *under or by virtue of its charter*, a right to use one drop of water from the Passaic, or from any other source, for milling or manufacturing purposes. I say this without any fear of contradiction. It is not a matter of construction. There is not one single word in the whole act incorporating the Society, passed in 1791, or in the supplemental act of 1792, which gives the right to use any water whatever for manufacturing or milling purposes. And, therefore, there are no words as to the construction of which lawyers, as they often do, may differ. I beg it to be observed, that I do not say the manufacturing Society has no right to use the waters of the Passaic for milling or manufacturing, or for any other purpose. I admit that if the company are the owners or possessors of lands on the banks of the river, they have the same right, independent of any charter, to use the waters of the river, which any other riparian owner has, or any individual would have, if he were the owner of the same lands; but, I repeat, that under or by virtue of their charter they cannot claim to use a drop of water for milling or manufacturing purposes."

That this broad and positive assertion may be proved, or that, as he says, "this may be made evident in a few words," he confidently appeals to the 17th section of your charter, and after arguing and quoting from it, most triumphantly refers to, and gives it entire in his appendix; *as your whole authority on the subject of water; but the truth is, this section relates to the water of the navigable canals alone, which you are authorized to make, and the rivers you are authorized to clear.*

The President of the Morris Canal Company, then, in making to the Board of Directors a serious official professional communication on a subject of law of great consequence to be correctly understood, *withholds from them the whole of the second section of your charter, which relates to*

the point in question ; and gives them the 17th, which has nothing to do with it.

This might be harmless practice at the bar, where another attorney, on the other side, might take up a book and show its fallacy ; but it is not fair, nor harmless, when practised on the public, where its impression may be made on many minds before the antidote can reach them, if ever. I will not believe, in my turn, that the Board of Directors could have lent themselves to this trick upon public credulity or confidence. It is thus made more probable then, that they never saw the letter till in print ; if they had, I doubt not they would have suppressed this precious document also. Mr. Colden is thus in a dilemma again. He has the choice of one of its two horns : either he has misguided the board, or the board has combined with him to misguide the public.

To leave no uncertainty as to the fact of the omission or commission, I here give the Preamble, and the 1st and 2d sections of your Charter.

*“ An Act to incorporate the Contributors to the Society for Establishing
“ Useful Manufactures, and for the further Encouragement of said
“ Society.*

*“ And whereas it is represented to this Legislature, that a subscrip-
“ tion has been made for the purpose of introducing and establishing
“ useful manufactures, to an amount which already exceeds two hundred
“ thousand dollars. And whereas the State of New-Jersey, having
“ been deemed by the contributors the most suitable for carrying the
“ same into effect, the aid of this Legislature has been requested in pro-
“ motion of the views of the said contributors. And whereas it appears
“ to this Legislature, that the granting such aid will be conducive to the
“ public interest.”*

*“ SEC. 1. Be it enacted, That all persons who have already sub-
“ scribed, and who, according to the terms hereafter mentioned, shall
“ subscribe, for the purpose of establishing a company for carrying on
“ the business of manufacturies in this state. their successors and as-
“ signs, shall be, and they are hereby incorporated by the name of the
“ Society for the Establishment of Useful Manufactures. And by the
“ same name, they, and their successors and assigns, are hereby consti-
“ tuted a body politic and corporate in law, and shall be able and capa-
“ ble to acquire, purchase, receive, have, hold, and enjoy, any lands,
“ tenements, hereditaments, goods, and chattels, of what kind or quality
“ soever, to an amount not exceeding four millions of dollars ; and the
“ same, or any part thereof, to sell or demise, alien and dispose of, also
“ to sue and be sued,” &c.*

*“ SEC. 2. Be it enacted, That the original or capital stock of the said
“ Society shall not exceed the sum of one million of dollars, to be em-
“ ployed in manufacturing or making all such commodities or articles as
“ shall not be prohibited by law ; and to that end in purchasing such
“ lands, tenements, and hereditaments, and erecting thereupon such
“ buildings, and digging and establishing such canals, and doing such
“ other matters and things as shall be needful for carrying on a manu-
“ factory or manufactories of the said commodities or articles.”*

The 17th section confers the power of “effecting navigable canals

“for the purpose of transporting goods, wares, and merchandise, to and
 “from some manufactory by them established, and also such parts of
 “such rivers and other waters as they may propose to open and clear.”

It was expedient that all the powers and privileges of the charter should vest in the Society as soon as, and wherever the *principal seat* of, the manufactories should be, and that the town expected to rise around these establishments should be governed by the usual regulations of populous places.

The 26th section, therefore, provides for it in the words following :

“*And whereas* it is deemed important to the success of the undertaking aforesaid, that provision shall be made for incorporating, with the consent of the inhabitants, such district, not exceeding in extent the number of acres contained within six miles square, as may become the principal seat of the intended establishment.”

“*Be it further enacted by the authority aforesaid*, That, at any time after the directors of the said Society shall have made choice of a suitable place for the principal seat of their said manufactories, and shall have certified the same to the governor of this state for the time being, it shall be lawful for the said directors to advertise in one or more of the public gazettes printed in this state, and also by advertisement affixed in the most public and notorious place within such district, to give notice that it appears to them conducive to the interest of the said Society, if agreeable to the inhabitants of said district, that the said inhabitants should be and become a body politic and corporate ; and if within sixty days after such public notification, a majority of the taxable inhabitants of the said district shall not express their dissent from the incorporation of the said district in writing, signed by their names, addressed and delivered to the governor of this state, it shall be deemed and taken to be evidence of the assent of the said inhabitants to be, and they shall therefore be created and become, a body corporate and politic, in deed and law, by the name and title of the Corporation of the Town of Paterson, to have perpetual succession, &c.”

Thus, taken in every point of view, the charter applies fully wherever the Society certifies to the governor that it is their choice it shall be considered as principally seated, and this choice having been certified, and the consent of the inhabitants ascertained, the incorporation of the town has been declared in due form under the seal of the State ; thus fulfilling and accomplishing its intention, and consecrating this noble stream, *the river Passaic*, its branches and sources, to the most useful of purposes.

The 28th section provides, “That this act is to be deemed and taken to be a public act, and as such to be *taken notice* of by all persons and courts of justice whatever within this State.”

When the Morris Canal enterprise originated, they could not be ignorant of this *public* act, and were bound to respect it.

And the 37th section provides, “That this act shall in *all things* be construed in the *most favourable manner* for the said respective corporations, nor shall *any non-user* of the privileges hereby to the said

“ corporations respectively granted, create any forfeiture of the same ;
 “ and notwithstanding the members of the said respective corporations
 “ should fail to meet and hold their elections, as is hereby specified, the
 “ said elections may be afterwards holden ; and may in such manner as
 “ shall have been prescribed by the laws and ordinances of the said re-
 “ spective corporations, and the officers for the time being shall continue
 “ to hold and exercise their offices until others shall be duly elected to
 “ succeed them at some subsequent meeting.”

Referring to the whole act, and appealing to the candour and good sense of the Directors of Morris Canal, I would ask whether it be reasonable to suppose that an association of some of the most intelligent men of our country, in the patriotic purpose of introducing and establishing useful manufactures, thus cordially met by an enlightened and equally patriotic legislature, would place their property in and under a charter not calculated to attain its *end and aim securely and certainly* ?

Mr. Colden, after quoting the 17th section at full length, and reasoning that the Society has no powers but what that confers, says (page 14) *more peremptorily*—“ Now, it may be asked, where are the *words* in this charter which gives the Society a right to take water *from the Passaic*, or from any other source for manufacturing or milling purposes ? It may be very confidently answered, that the act of incorporation contains *no such words*. That there may be no mistake upon this subject, *every part of the act, which has any relation to, or which even mentions waters or streams, are printed in the appendix.*”

But the 2d section is not printed in the appendix. Permit me to penetrate, if I can, his meaning ; for though lawyers, he says, will disagree about the meaning of any word, as it is their province to cavil, if they can condescend to it, yet men of common sense do not differ as to the import of the *names of things*.

The Society's act of incorporation confers a chartered privilege to take effect wherever, on any river in New-Jersey, it should be found expedient to fix the principal seat of manufactories. To guide their choice, the contributors of capital invited, by public notice, information of the local advantages occurring on the several principal streams ; and the communications they received were from all quarters, descriptive and explanatory thereof. Those which described the Passaic, spoke particularly of Green Pond as a place where a reservoir might be formed to supply the excessive diminution of the rivers by evaporation in the summer season. It was then computed as a recommendation of the purchase of the privilege at the great falls of the Passaic, that above two hundred water wheels might be driven. It was finally the persuasion that this stream afforded both the *greatest and surest* supply of water which fixed the Society's choice there.

The act, while this inquiry was going on, could not name this river or any other specially, because the Society was to choose from among all in the State. But it grants and assures all the privileges of the charter to that place or situation, where, having acquired the property by purchase, the seat of the manufactories should be fixed. The *power to choose* designated the place which should be chosen ; and the object of

the choice being water power, it designated the stream chosen. Of course the moment this purchase was made the location of the principal seat chosen, and that choice notified to the governor, every provision of the charter attached and belonged to the seat at the great falls of the Passaic, as much as if it had been designated *by name* in the act.

Then, by the 2d section of the charter, *where* you had thus chosen and fixed the seat of the manufactories contemplated, the charter confers the express right *to dig and establish such canals, and do such other matters and things as shall be needful for carrying on a manufactory or manufactories.*

Now will Mr. Colden explain to the Board of Directors how he supposes *these canals were to be filled with water* for this purpose, if not from some stream or river in the State! Perhaps, however, I have all my life been under a mistake as to the meaning of the word *canal*! Were he to define it, I presume, to be consistent, whatever he may think it means *at Dover*, he must say, *at Paterson* it means a mere excavation in earth or rock to be filled with *air*, to carry on some manufactory, to which boats are to come buoyed up by this element. And I am the more convinced he would give this definition; for on turning to his annual report of May 1, 1827, and 21st paragraph, I find he says, “the *boats* that take coal from the Lehigh mines, will deliver it at the *doors* of the consumers in the city of New-York.”

Seriously, the impression which Mr. Colden wishes to make by pronouncing, in an authoritative peremptory voice, the utter uselessness of a charter solemnly granted by the state, (which, however adequate, is no more than adequate to its object, truly a State object in its origin and in its effects, whoever may own the stock,) might well be regarded as harmless, or as not possibly affecting or influencing the tribunal to which the Society is carrying the question of the lawfulness of the Morris Canal Company's pretensions; but, his pamphlet has spread so widely this *his professional opinion*, that it was and is useful, in a few words, to show its fallacy, and that his mode of supporting it was by the new rule in logic, *omission*.

It may, therefore, be further mentioned, that it is a rule in courts of equity to construe *the whole* of an instrument, *and as a whole*, in order to get its true import. This rule he surely knew; but, in addressing the Board of Directors, did not consider them a judicious nor an equitable body.

But the people are to be considered so. There was a certain useful purpose to be attained and promoted. A good adaptation of means to ends is ever the part of wisdom. The capitalists who were willing to contribute money, and the legislators who were to make the law, were in perfect accord and understanding on the subject. The former had a well defined object, which the latter approbated and wished to encourage. They said, choose out the best place, make your purchase, and there the law shall give and apply every power and protection, needful and proper, to a great and permanent seat of manufactories.

Now what was more essential to that object than the permanent command of the water power in its full extent? All depended on this. Would the contributors have felt safe? Would they have, as prudent men, ac-

cepted and acted under a charter, which a future legislature might at pleasure annul? Or, by some counter act, deprive them of their water? The durable application of the means to the end would have thus vanished. The contributors would not have invested their money in a manufactory there, had the water power been then limited, or subject to limitation, in time or quantity, arbitrarily. The very spirit and essence of the contract between the Society and the State, was the implied guaranty of the continuity of the natural water power. This was the vital principle. These capitalists would else have gone to another State. This principle was the *sine qua non*. Whatever else was given was by way of encouragement, and promotion of the object. It was a purpose in which the State made common cause with those persons, and the perpetual interest of the public in manufactories, made the charter necessarily a perpetuity. It was, therefore, to this full extent, in the nature of a contract. Wherefore no subsequent legislature can, nor can wish to, destroy the work of the State, under this contract; for this would not only be tyranny, but the worst possible policy. No legislative act then can incidentally, any more than directly, divert away the water power of the Passaic manufactories. The Morris Canal was enacted consistently with existing laws. Your charter is a public law. Your water power is the subject matter of that law. That power is the whole water naturally flowing at the great falls of the Passaic. The law did not limit the Society's canals, manufactories, or water power. No part then can be taken or diverted away under a later law of the State, any more than the whole. Nor *was this the intention* of the legislature in 1824. The Morris Canal Company appeals to the *State's Commissioners' Report* to prove the adequacy of Hopatcong Lake, as well as their sources of revenue. The same reference you may also make to explain the meaning of the legislature. That report, those surveys, the limitations of their act, are public documents explanatory of that meaning. No mention is there made of the Passaic waters, except specially limiting the company to so much thereof, as may be led by an artificial feeder from a reservoir formed by raising Green Pond, one of the sources of the Rockaway branch. Had it been their intention to allow the Morris Canal Company to take the waters of the country generally, they would not have designated those they should take in any instance: reservoirs being incident to canalling.

It could not at that early period, 1791, have been supposed possible, while the Delaware river should run, that a project so extraordinary as a canal over *Schooley's mountain* to bring Lehigh coal to New-York, would be undertaken. Nor is it conceivable that if any such interference had been *imaginable*, that the most explicit protection would not have been given. The legislature in doing so, would have not only protected the Society against such interference, but its own subscription to the stock, for the state. Does it make any difference with the people of New-Jersey; or in principle, now that the state has exchanged its stock for land?

The early misfortunes of the manufactories, which caused that negotiation and change, also diminished the number of members of the So-

ciety. Its prosperity may again increase them; and will do so the moment the Morris Canal *invasion is repelled*.

It may not be generally known, that the Society in its early operations, engaged largely in manufactories at Paterson, and by causes already mentioned, as well as by fire, lost no small amount. The members were justly discouraged, and many sold out. The State also sold the shares which cost 10,000 dollars, to the present proprietors, not at a loss, but for 11,000 dollars, receiving payment in lands chosen and appraised by persons appointed by the legislature. These lands are situated *at and near* the town of Patterson; and are now worth, I am informed, 25,000 dollars, in consequence of the present prosperity of the manufactories. But were they to be interrupted, the cause of this augmenting value would cease and the lands fall back to the common price of farming lands, and probably be worth five or six thousand dollars only.

It is unquestionably owing to the judicious management of the present proprietors and officers of the Society, that it was sustained through a long period of bad times, and on the earliest prospect of success, by the application of funds, in building factories for the accommodation of skilful workmen, and joining in their operations, that the institution has, so far, so remarkably fulfilled the intention of the legislature in these establishments, whose usefulness is unrivalled in any part of the United States. The cotton, the iron the sailcloth manufactories, are all in great perfection, and machinery for others is made here so excellent as to be ordered from hence to the Eastern States as well as the Southern. It is impossible to conceive of any plan of managing this institution better to fulfil its purpose, and more usefully to employ the great water power of the Passaic. If any body can suggest a better plan, you would, I am sure, be glad to learn it. The legislature wisely limited your operations in manufacturing to a certain capital, leaving the mode to your own discretion. This in effect *restricted* the investment to one place, and as wisely allowing also an ample capital for the other purposes contemplated in the charter.

To make navigable canals is your privilege, and not an imperious duty. The time, however, was near, when to open the natural navigation to Chatham, Dover, and Pompton, from tide, would have been expedient but for this interference of the Morris Canal Company with *the water*. How far westward your improvements might be pushed, would have depended on the demand for accommodation and supply of this growing manufacturing city.

The natural outlet for the products of the valley of the Musconetcong is no doubt by that of the Delaware; but, as this route carries them a circuit into Pennsylvania, it is probable that a rail-road *over* to the valley of the Raritan to Brunswick in summer, and to Amboy or Elizabethtown in winter, is the cheapest route to the New-York market; though so far as the *Paterson market* may invite, a connexion with a railway leading there may be desirable. The Morris Canal, if it were finished, does not accommodate the numerous mills of the valley of the Musconetcong. Its course diverges to the north, and passes even on the northern side of the valley of the Pohatcong, where no business originates.

There are so many flour mills on the Musconetcong, that it will soon become a very interesting inquiry, how this valuable part of the State may most conveniently have access to the greatest of our markets. A spirit of accommodation in all interests, will insure that of all.

Notwithstanding the promise of more water than ever to them, it is astonishing to me that the valuable privileges of that stream were so little protected by the Morris Canal act; for there is no comparison between the usefulness of mills to a district of country and a canal. If the products of the industry of a populous district had *no* outlet but bad roads, and a canal could be made, it would be useful, if not destructive of the water power; but when this branch of industry and property, this reliance of the people around, has been established half a century, to disturb it all to its very foundations, just to give passage by a canal to the coal from a mine *external* to the State, to a market also external to the State, and for the benefit of an association of men who live principally out of the State, and whose property in the canal is not New-Jersey property, but stock any where else owned, nor their object the public good, but their own emolument, it seems to be giving up a valuable certainty for an uncertainty. But if these disastrous consequences were not to follow, it is clear that if there should be the least interference with the Musconetcong mills by the deprivation of water, the Morris Canal Company will not have fulfilled its part of the contract, and their law ought to be annulled; for the act would not have been passed but for the assurance given by the commissioners and engineers, that Lake Hopatcong could be formed into a reservoir, adequate to keeping up that supply in the summer months, and that its discharge was more than sufficient both for mills and canal. The Musconetcong mill owners, like the original contributors to the funds of the Society, had never conceived it possible that a canal could be projected over Schooley's mountain, and had not therefore applied for a charter to protect their property in the water. They believed themselves protected by their mountain barrier against New-York speculation.

Indeed as to the Passaic, public opinion was so settled on the subject of the vested rights, and the value to the State of the Paterson manufactories, that those who made the Morris Canal Report did not *dare to intimate the most remote design of taking any of their water for the proposed canal*, though its line was to pass along by the stream.

The attempt now to take it has *the appearance* of a trick practised upon the confidence of the legislature; and since the company has a delicate sensibility (page 19) "to the appearance of being dissatisfied with the charter, and of being desirous of having further privileges than those which had been granted to them." Mr. Colden will excuse me if I should take the freedom of a courteous adversary to put him on his guard, and in mind of these *appearances*. There is another appearance to which I would call his candid attention—*his ingenious attempt to smooth over the effects* of the intended trespasses on the Passaic waters. The shallow artifice of pretending to bring in as much water as would be taken out to feed their canal from Dover to Newark, 44 miles, viz. about 68 millions of cubic yards in seven months, being exposed, he has

recourse to the palliative assurance, that very little or no damage would be done thereby. At page 10, with this view, he says—

“It must be borne in mind that all the waters which escape from the sides and bottom of the canal, will augment the waters of the Passaic. Professor Renwick calculates that the annual expenditure on this account will be 3,300,000 cubic yards. General Bernard and Colonel Totten estimate the quantity which will be expended by filtration, at 4,560,000 yards, very nearly half of all the water which, by their estimate, will be required for the whole canal. Mr. Sullivan takes much pains to show that neither of these calculations as to the water which will be lost to the canal by leakage and filtration, *every drop of which will go into the Passaic*, are sufficiently large; he thinks we should rely on his superior science and experience, and believe that the quantity which will be lost to the canal by these means will be much greater. And yet he insists we ought not to be allowed to take any water out of the Passaic, not even any portion of that which we bring in, because we may injure the mills at Paterson by the abstraction.”

My report not being addressed to the Morris Canal Company, but to the Society, I cannot be rationally accused of *expecting* that they would *rely* on my superior science, but that *you* would rely on my statement of the *experience* of Erie Canal, and the calculations applying it to Morris Canal. Indeed it would have had a *better appearance* had they admitted it, since all American engineers and canal companies now refer to it and rely on it—except this one company, guided by superior intelligence in their presiding officer, to whom even the laws of nature must bend. To explain:—

I had demonstrated in the report, page 42, that the lake and brooks would not supply the demand of water on the summit and western sections, and that therefore the supply of the eastward sections would have to depend on the water abstracted from the Rockaway and other branches of the Passaic. But all this water, the 3 millions and the 4½ millions of cubic yards, allowed for filtration and leakage, commonly considered *as lost*, will not, on this highly favoured canal, it seems, be lost, but *every drop* thereof will find its way into the Passaic again.

This indeed has the appearance of being a great discovery, considering that the laws of *evaporation* and soakage must be suspended as to this leakage water, wherever it may come from:—though apparently, if the canal leaks, it must come in greater quantity from the Rockaway branch of Passaic itself.

But what strikes me with the *greatest admiration* is, that as those allowances are for *the whole length* of the canal, this leakage and filtration will not only *disobey* the influences of the atmosphere, but resisting the power of gravitation, will collect itself into marching order, *every drop of it*, and ascending Schooley's mountain, will pour itself into the Passaic. This is no doubt the proper explanation of Mr. Colden's canal philosophy, by which the Passaic is to receive more than is abstracted. Like the favour done to the Musconetcong owners, the more they lose the more they are to get; and this might be literally true, though not of water, had the company wherewithal to pay damages.

But seriously, if the Passaic is to get back all that is lost by filtration

and leakage from the canal, can Mr. Colden devise some philosophical theory by which it will get back what is lost by *evaporation* from the surface of the canal, by *lockage*, and by *being led away* to tide at Newark?

Perhaps, however, he only meant by this *exaggeration* to pay me for one of mine; for he says, page 23, "Mr. Sullivan, in his spirit of exaggeration, speaks of the canal as now extended, as if the whole of it "must be supplied from the lake."

But as I am not much in the habit of hyperbole on matters of canalling, I anxiously turned to page 41 of the report to see if I had made a mistake as to the length of the canal, but find I have correctly stated the distance from the Delaware to Newark, by its route, to be 94 miles, as measured this year, exceeding a little the printed map.

The divisions of it are, (excepting fractions,) from the Delaware to the Lake,

Thence to Dover, above	42
Thence to Paterson,	8
Thence to Newark,	30
Thence to Jersey,	14
	12
	<hr/>
	106

Still *he* has to account for another exaggeration on his part. The Society very properly remonstrated against any act of the legislature which, in extending the canal to the tide on the Hudson, should by implication renew a charter abrogated by its own conditions; and this too is considered by Mr. Colden as filling the *tide canal with Passaic water*. What is it that, whenever the idea of Jersey City and the canal conjoin, so disturbs the mind of this excellent gentleman? I perceive, with some suspicion of the cause, that he says, somewhere in his reports, that from the first moment the project was announced, *this place* was deemed its most proper termination!!

Self-defence is the sole motive of the Society in all the measures it has taken or will take. It is this motive that requires not only the vindication of my report and myself, but your rights as a corporation. With the same view I go a step further, and show that were you not protected by your charter, the Morris Canal Company has no power, no property, wherewith to remunerate you as riparian owners.

Their aggression is like the spirit in which their enterprise was conceived—bold and reckless it braves not only the frowns of nature, but the sure occurrence of *rival State works*—not even condescending to conciliate the people along the route; but under pretence, probably, of example somewhere, notwithstanding the guards set in some other parts of the act, the people injured are in a manner disfranchised. To be explicit: The act begins with a literal departure from the letter and spirit of the constitution of New-Jersey. By the 22d section, the people have the right of trial by jury. This is declared to be as sacred a right as liberty of conscience, and as the annual elections. These three rights are the pillars of civil liberty. Every man in the State would risk his life to defend the constitution.

Instead of a jury of *twelve* good and competent men, *three* men are appointed appraisers, and to be in the pay of the company. They are indeed appointed by the Justice of a Supreme Court, and are on oath; but they are to be appointed when the engineer, under the orders of the company, shall have surveyed and made maps and descriptions of the land and waters he deems necessary to the canal. He or any subordinate person makes oath that they are necessary; then the justice is to certify these surveys to be the surveys of and for the canal, and appoint the appraisers.

What is the operation of this provision? It is demonstrably most unjust to the parties suffering damage. Should it not be perfectly convenient and agreeable to the company to pay them, they may never be paid.

The return of these surveys may be delayed unreasonably long, and the appointment delayed. It is now four years since the work began—Has there been one appraisalment?

Again, this return of surveys may be from time to time; no time within which it shall be done is named. The first or the second return may not be complete. Possession and use is had however from the beginning.

The book containing the surveys is to be deposited in the county clerk's office, but no copy is prescribed to be furnished the claimant; and no other surveyor can furnish the same evidence. If he makes a copy from the Great Book, who is to certify it? It is thus objectionable evidence. Besides, if the engineer should have mistaken a christian name, or misspelt a surname, the evidence would not apply. The appraisers being in the pay of the company, though under oath, may make what they deem reasonable delays, and having no power over the engineers, cannot call on them even to rectify a mistake that would be thus fatal to a just claim.

But when are the appraisers to act? When either party *requests*. The company cannot be expected to request it. The claimant then *must*, if he would, obtain remuneration. The three appraisers live in a different county. He seeks them out, and makes his request. They may or may not attend to it. Being in the pay of the company, they may at least consult their employers' convenience, not being bound in point of time. At length they attend to the business of their appointment and appraise; make their award; make the deed too in behalf of the owner; acknowledge it too, instead of him. The company is bound to pay the award, but no time is prescribed. It is not provided that unless they pay the award in thirty days, their charter shall be forfeited. They tender the amount when they please. If the owner accepts it, well and good; if not, *the deed is put on record, the title vests in the company by the appraisers' deed*. The original owner now has *his remedy at law*; and what is that?

He demands the amount of the award, and is refused. He sues. How does he support his action? His whole evidence is the award; and that is on the hands of the appraisers, and they may or may not furnish it. Or it is evidence in their hands against him, if he demands more than its amount; and yet it may be just to demand more than its amount. The appraisers go by the survey. The survey is attested by any subordinate

agent of the company—the whole testimony seems to be vested in this unknown, but now important personage. The survey may have been accidentally erroneous ; it may not have comprehended the whole of his land, nor his water power as well as land. The owner may have refused the award because it was partial, and yet there is no appeal. There is indeed an after provision that permits aggrieved parties to sue, but the answer to them is, you have been dealt with according to *our law*—and if you recover judgment, it can only be for the amount of the award. Finally he may recover judgment to this amount, and *takes out execution*. The company may now laugh at him ; for on what can he levy to satisfy the recovery. The land on which the canal is made, if acquired, he cannot levy on, because, besides that it is represented by the shares, which are personal estate, it is a franchise. He cannot even levy on that part of it which was his *own land or mill* taken from him, and for which he is now seeking remuneration !!! It has been vested in the company, and transmuted from real to personal estate, out of reach of execution for a claim thus the most just. The power seems to be all on one side, arbitrarily exercised by this exemption from the established jurisprudence of our country.

What chance of justice could *the Society* have against the Morris Canal Company, were it without protection by its charter. How easy it would be for some person in their employ to think and swear that all the waters of the Passaic are necessary to their plan of canal ? And if appraised, where is the *lawful capital* to pay such damages ? The Morris Canal act, being within reach of legislation, ought, in my belief, to be wholly repealed, and remodelled *on usual principles, and in express reference to the State's Commissioners' Report*.

It is an important question, Whether the Morris Canal act is still within reach of legislation or not ? If it is not a corporate body, according to law it is, and it may become a serious question to individuals, Whether the acts and doings under it, are not personal transactions ? Whether the directors, for example, who have borrowed large sums, have not done so as associates ?

The act provides, as an indispensable requisite to the corporate existence of the company, that the commissioners named in the bill, open books of subscription, obtain a capital of one million of dollars, and that one hundred thousand dollars thereof be paid down, at the time of subscribing, in good money, and that they shall deposit this sum in a bank for safe keeping until the first Board of Directors shall have been chosen, when they shall pay it over to them. And it is also provided, that all this shall have been done on or before the 1st of November, 1825, on pain of losing their charter, expressly declared null and void if not done. The intention, no doubt, was to assure *an adequate capital and prevent speculation*.

Were these few and simple prerequisites to the corporate existence of the company complied with ? This is the question I now propose briefly to examine. Nor shall I need to adduce other testimony to the contrary, than what is furnished by a public document of their own.

In February, 1828, in consequence of incurring debts, which a compliance with the law would have rendered unnecessary, the company

applied to the Legislature of New-Jersey for a loan of half a million of dollars.

There is truly something *ludicrous* in pleading to the same body that prescribed the preliminary steps, the neglect of them as a reason for indulgence and more confidence. The petition states, "that when the books of the subscription were opened according to the provisions of the charter, more than seven millions were subscribed; of this more than six millions were of course refused."

Is it possible that Mr. Colden, in signing this petition as President of the Morris Canal Company, intended that the legislature should understand, and did he mean to convey the impression, that *seven millions of dollars had actually been offered, and stood ready to be invested and embarked in the work?* For so it seems.

And if so, how unaccountably strange, and most strikingly discreditable to the undertaking, this great falling off in faith in it to such a degree, that in the lapse of a few weeks, out of six millions refused, there could not be found, among all, men who would then be persuaded to take one tenth part that sum to fill up *the vacancy in bona fide subscription!*

Again, "the capital of one million was declared to be taken, and stock of the company was issued to that amount."

How obvious is the inquiry, To whom was this important fact declared, if not to those who had taken up the million of stock and paid in 10 per cent. thereof? Were they not then called together by the commissioners to choose their Board of Directors, that they might pay over to them the 100,000 dollars? Who were the first board? From what bank, where it was deposited, did they draw that sum? And to whom did they pay it? But these natural questions are answered by the petition itself, which acknowledges the fact, which I might else prove, that the subscription, though declared, was not legally filled, as will appear presently proven by confession.

The petition goes on to say—"But when inquiry was afterwards made by the *new direction*, as to who were the holders of these shares, it was found that six thousand out of ten thousand shares, which was the capital of the company, had been subscribed in the names of irresponsible persons, who insisted that they had subscribed these shares for the benefit of the company."

Now it is not of the least moment whether this inquiry was made by the new or the old direction. Corporate concerns are characterized in law by conformity or non-conformity to the law. These irresponsible persons had or had not paid in the 10 per cent. If they had, then they were subscribers; if they had not, then they were not subscribers. If they had voted mean time in choosing the first board, not being legal subscribers, that board was not legally chosen, nor was the company then or since a corporate body legally organized.

The company tell the legislature that these unsubstantial *non bona fide* subscribers, not only did not pay in their 10 per cent., but pretended to have made their subscriptions *for the benefit of the company itself*. This proves the fact of the *non-payment of this 10 per cent.*; especially, as this plea was admitted, they could not have paid it for themselves nor as agents of the company, nor could the company have paid it for them, not

being in existence ; for the company that was to be created could not speculate in its own stock, because no such company could have legal existence as a corporation until the whole million was taken up, and owned by individuals so responsible and in earnest, as to have paid in one tenth part thereof.

It is not even pretended that those persons did pay ; for the sum, if they had paid, would have stood conspicuously credited to the use of the *bona fide* subscribers. To show that it is not, I shall state here presently the account of finances exhibited in the petition to the legislature.

It is clear and incontrovertible that the subscription to the stock was not filled according to law. And I bring Mr. Colden himself as a witness to it. He says in his annual report of May, 1827, " Had the stock, instead of so large a portion of it being disposed of as an *object of speculation*, been divided among those who subscribed to the amount of " seven million of dollars when the books were opened, the company " would have been enabled to complete the canal this season."

Disposed of as an object of speculation ! How disposed of ? Who disposed of it ? To whom was it disposed of as an object of speculation ? These questions may be properly raised in a court of law or equity. The passage quoted goes only to prove what indeed he acknowledges, that six hundred shares were disposed of as an object of speculation to persons, who, failing in their expectations of a premium, returned them vacant upon the *bona fide* subscribers, not having paid in the 60,000 dollars, which, to be a valid subscription, they should have paid, and which, on forfeiture, should have accrued to the sincere stockholders of the 4004 shares. But I will let Mr. Colden tell his own story again, as in the petition, in print, and on the legislative records.

" The company then found that they had in fact only four thousand " of their shares subscribed ; that they had six thousand on hand, and to " construct a canal that was to cost a million of dollars, they had no " other resources than the instalments as they would become due on " subscriptions, amounting in the whole to only four hundred thousand " dollars ; besides this, certificates for shares had been illegally issued " and pledged to a bank in New-York—these were afterwards redeemed " by the company, with great difficulty, but without any loss."

Certificates of shares illegally issued ; these must have been blank certificates, surreptitiously filled up and issued—but we have just given a quotation in which stock to the amount of a million had been issued. But this seems to be a mistake. The non-paying subscribers very properly did not have their certificates. They remained blank.

It was indeed an *Egyptian task*, of which tyranny the legislature is not to be accused, that the company had to make four tenths of their capital effect the purpose of the whole. But where was the great public exigency or necessity of proceeding with inadequate funds ? Had the 1st of November, 1825, already passed by ? If not, could not the commissioners open the books anew ? If that limitation had expired, then it was surely unlawful to open them ; indeed no authority existed to open them afterwards, for the corporation had died a natural death, according to a provision in one of the sections to that effect, that unless

the capital of one million be subscribed on or before that day, the act is thereby declared to be null and void. Is not the act then null and void? Does not the law itself say so, in the event described and confessed?

The legislature, it is true, may indulgently pass over the neglect of its laws, because it is not their department of government to execute them; but, whenever this question is brought into a court of law, the bench will go by its provisions, and by the evidence of their fulfilment or non-fulfilment. The aggressions and aspersions of the company and its President, will justify in self-defence raising this question by quo warranto.

The natural and necessary consequences of this departure from the prescribed line, has been deep indebtedness and almost inextricable difficulty. The injustice to the *bona fide* subscribers of proceeding without the whole capital, in the faith of which they did subscribe, is obvious in a *cruel loss* to them of the whole of their stock. For of what value to them is their stock, if the judgments confessed and recorded are effectual security? What part of what has been expended is 253,000 and 150,000? 400,000 is one half of 800,000, but will the stock in market now bring 320,000? I hope however it will rise, when all the favourable "circumstances" are known.

The statement in the petition was as follows:

That the instalments paid in on 4004 shares, amounted to	\$270,555 03
on 3135 shares,	74,334 72
	<hr/>
	344,889 75
Loans,	253,000 00
	<hr/>
Expended,	\$597,889 75
	<hr/>
Requisite to finish the canal if it cost only one million,	\$372,651 00
Requisite to pay loan,	253,000 00
	<hr/>
	\$625,651 00
	<hr/>
Instalments due on 4004 shares,	\$129,844 97
on 3135 shares,	239,165 28
	<hr/>
	369,010 25
Deficiency unprovided for to finish canal and pay loan,	256,641 00
	<hr/>
	\$625,651 25
	<hr/>

But the petition also states that the company has 2861 vacant shares, worth at par 286,100 dollars!

Vacant shares worth par!!! What, then, must the *full* shares be worth? It seems to common calculation that *par* means as much as has been *paid* in on them; and as *nothing* has been *paid* on them, *par* must be *nothing*, instead of 286,100 dollars. There is indeed some difference! They are not then actually shares, or stock, but *room for stock*. What *room for stock* in *Morris Canal* is worth, is a question that would

puzzle the board of brokers, and all Wall-street, to determine! for it must be somewhere in the scale of *minus nothing*, if full stock is 60 per cent. below par.

Those vacant shares, however, have some value, they are *witnesses* of the fact that the capital stock never was fully taken up. The necessity of borrowing and of mortgaging the canal is also a proof of this fact. The confession and record of judgments for loans, is a confession of the character of the proceedings of the company at the beginning!

Nor is this all that has the appearance of being illegal in the proceedings of the company. There is no provision in the law that the corporation as such shall hold any of its own shares; but, on the contrary, that it shall not. Will Mr. Colden point out to those who have been induced, by large discounts, to take 3135 shares since the 1st of November, 1825, where there is authority in the law to open *anew* the subscription *after that date*? Will those subscribers be bound to pay for stock if illegally issued? There is a rule in equity as well as law, that there shall be value for value. Were they issued after record of judgments, could they *then* have any value? What has been the decision of a case of this kind lately, where the company sues a subscriber to this after-born stock? It is not yet decided.

Since the judgment for 600,000 dollars, another has been recorded for 200,000 dollars; and how much more money will be necessary, we can judge from the cost of other canals. Erie and Champlain cost 23,100 dollars a mile; Schuylkill, 20,000; Middlesex, 17,000; and sixty canals in England average 17,000. What, then, does Morris Canal come to, being 94 miles in length, taking the average of the three American canals? Surely not less than 20,000 dollars a mile, which is 1880 thousand dollars, without including great damages to mills. We are willing all deductions from this average may be made that any interested party pleases to make. Such is the fact as to other canals. But the more cost the more security to creditors who hold recorded judgments!! It would be friendly in Mr. Colden to inform *the creditors*, How their judgments are *ANY* security? How and on what they will levy their execution next year? Will they levy it on the canal itself? The title of the land is not yet in the corporation, unless, as they indeed pretend, it vests, according to their act, on the mere survey and taking possession without paying. This, however, the claimant in a late suit contends against; and others are addressing the legislature from one end to the other of the line for redress. Besides, if *the land were acquired*, it is by law personal estate, in shares, *intangible* and unsaleable by execution, being a franchise which, as creditors, they have no right to use or to accomplish. What remedy—what resource then have they? By a process in chancery they may stop the *income*. But where is the income unless the canal be finished:—unless they have an ample supply of water? An abundance of coal to carry. There is indeed one way; the creditors, in order to make their security of value, may *lend* two or three times as much more to complete the work! And then what? Refer now to the commissioners' and engineers' *original computation of revenue*. They made all the income except 34000 dollars to depend on *Lehigh coal*. Finish the canal then to the Delaware if this can be depended on! Out of the remainder, 34,000, Mr.

McCulloch deducts 20,000 for management and repairs. I have, however, rather more practice than he, and do not think this allowance quite enough for a canal which has 26 inclined planes.

Mr. Colden, however, says, "If we were never to carry a bushel of coal, our canal would be profitable." From whence? How? What does he mean? Yes, truly! By the sale of surplus water. The milling power of the company. No doubt: No difficulty! The Morris Canal Company can raise money enough the moment they can set aside the protecting charter of the Society.

Their expectation and reliance on the resource of subverting so old and successful an institution, will be found to be as presumptuous a departure from principles of property, as their canal is from the laws of experience in canalling and operative mechanics.

Though I am fatigued with the number of corrections Mr. Colden has given occasion for, I cannot deny to the *stockholders* yet another, which much affects *their* interest. It relates to all their 26 inclined planes.

It seems the *foundation walls* of one of the inclined planes at Bortown had given way, and requires to be relaid. This circumstance may have alarmed the directors. Wherefore Mr. Colden says, (page 29,) "That they may be made sufficiently strong there can be no doubt. We see that *the walls* of the plane of the Dry Dock bear a moving weight of six or seven hundred tons; whereas the walls of our planes will require only sufficient strength to support thirty-seven tons, which is the weight of one of our cars, with a boat and a cargo of twenty-five tons."

He does not surely wish to mislead the judgment of the board, nor create unfounded confidence amongst the stockholders. It is indeed unaccountable, that one who appears to be so intimate with the President of the Dry Dock, should be so ignorant of the fact, that the inclined plane of the Dry Dock is *on piles* driven as deep as possible into the ground from one end to the other, and *has no foundation walls*.

Besides that, no masonry would have stood the *reiterated* passing of six or seven hundred tons. The ship is on a carriage which has nearly as many wheels as can be placed under her—certainly above one hundred points of support; while the *canal cars* have but *four* points of support for 35 tons. A weight then of nine tons, nearly, is to pass successively, many times a day, over every part of a wall, of no considerable depth or breadth. This wall would no doubt have stood the *invariable* pressure of an edifice. But the action and reaction of a *passing weight* is quite a different thing in principle, and, like percussion, is cumulative of effect. An imperceptible effect of action reiterated, becomes perceptible more and more, and by and by a *disturbing force*.

Now the perpendicular lift which I recommended, and in which it was well known I was and am an interested party, but which is not now offered to the Morris Canal Company, was free from this cause and this effect. The weight borne would have been a steady, invariable, equal pressure; and could be calculated and relied on like that of any other edifice. There was nothing *uncertain in it*. But the inclined plane is a *perpetual experiment*.

In thus fairly examining the several topics raised by the "Answer," it is not my wish to disparage the Morris Canal as a property. It has its merits as a work; and had it been founded in expediency, would surely have been a noble one. Restrained to the limits of its lawful privilege, it is not necessarily abortive. It is in danger of being so, only from breaking over them.

To keep this, to them, important truth in mind, I suggested in the report the probable practicability of forming reservoirs with the winter water of the lake, when they shall have acquired a right to it, on the east of the mountain:—as by devoting the whole supply to the eastern section, so much of the canal may be made valuable, though not with inclined planes. And I now add, that then, if there be a surplus, it might be disposed of for milling purposes, should the legislature grant leave.

But this *new privilege* can never be asked and obtained while the Morris Canal works at Dover, at Powerville, and other places, *continue as they are*, calculated to draw away the Passaic waters from the manufactories; because the design of these works has been confessed, and the sufficiency of the lake water has been acknowledged. The Morris Canal Company can never successfully approach the legislature without having practically relinquished that design; for that design has made the State a party to an unconstitutional act against its will, as we have no doubt the proceedings of the company would be adjudged to be.

It is next my task to endeavour to account satisfactorily to those who may have known or heard of Mr. Colden in public life, and as a respectable man, old at the bar and in legislative office, for *the policy* of his mode of defending the company against the experience of Erie Canal. His personalities having no relation to the points in dispute, could have no weight as argument. He may have thought they would turn attention from himself, however, as the cause of the company's misfortunes; unless they were to answer some purpose, the stockholders will no doubt say that it was scarcely *prudent* for their great financier, at the moment of seeking new loans, to provoke and invite a free animadversion on the concerns of the corporation as a public institution historically from the beginning. He does seem to have attached more importance to the report than I expected; and it might have been more safely met in the walls of the court of equity.

But to myself it is accounted for, as an attempt to discredit the systematic opinion of your engineer, and was expected to assist in gaining some temporary point, such, for example, as a *new loan*, notwithstanding previous judgments.

But this is not quite enough to account for it. Mr. Colden may have thought that the weight of his character was sufficient to bear down *the proof* of a baseless project, and of the intended aggressions of the company over which he presides. He has however yet to learn his own value; that calumny, satire, and sophistry combined, will have less influence upon a reasoning community than one solitary *fact*; that the public, or so many persons as may be concerned in this property, have far less interest in *men* than in *truth*; that even the Morris Canal Company feel less interest in *himself* than in the *question*, how they shall

find present and future value in their stock. And since Mr. Colden has said so much of me that was not true, I will take the freedom to say one thing of him, however unwelcome, which he must be conscious is true—that he has *lost for ever the fairest opportunity of distinguished usefulness*, that has been presented to any man at the head of a corporate institution; for he came into office, as he says in his petition to the legislature, in July, 1826, after the *predecessors* of the *new board* had, by bad management—done what? “prostrated the *credit* of the company, “and in a great degree interrupted its operations; that the present “board had to retrieve the *character* of the company, which had suffered “so severely by the bad management of their predecessors, and to “struggle with that want of means, which a diversion of the funds and “resources of the company had occasioned. In this they had so far succeeded, that since July, 1827, the work of the canal had been prosecuted with great spirit and force, and progressed so far that it may be “entirely finished in the fall of the present year, (1828.)”

Has he retrieved the credit and the character of the company? Let public opinion answer! Let the price of the stock answer!

Not knowing who were the first board, with one exception, I have no doubt those gentlemen are able to vindicate themselves if there be occasion, as might that one; my position is, that the bad management alluded to was not *loss of money*, but *loss of credit*. And why so? Because the prescribed prerequisites to corporate existence not being regarded, the want of capital had caused a want of loans; that the time for legal subscriptions had expired the preceding November; that they had expended a considerable part of the 400,000 dollars without any rational probability that the rest of the capital would be taken up; that the fair subscribers to the amount of 400,000 dollars (no small sum) stood in need of a presiding officer who would, by his *good management*, save their investment, and conduct them out of difficulty to success.

Then was the opportunity for the moral courage and high principles of Mr. Colden to have achieved a conquest. As a financier, he might have stopped the expenditure until an adequate sum to complete the work was had: a calculator might have proved that else all would be sunk that should be put in; that the *first* great debt for a loan would swallow up the whole property. The undertaking was either a good one, or the contrary; if it bore the severe scrutiny of a rational computation of revenue, delay would not impair its purpose. If it would not bear examination, why proceed?

If convinced it had not originated in an airy speculation, but was a sound project, even in the event of the making of the Raritan Canal, then, as a lawyer, understanding the whole history of the early proceedings, and holding the commanding influence of the profession, as well as his office, he might have led the company back to the line and limits of the law, and taken at once the commanding position which rectitude always gives.

The company under his guidance might *then* have approached the legislature with confidence. As the saviour of the institution, he would have asked for a prolonged term wherein to open the subscription anew—leave to repair the foundations with solid wealth, before the super-

structure of credit should have been raised. As a jurist and friend to equal rights, he would have asked the restoration of the right of trial by jury to the people whose property the company would have occasion to use, that if not agreed with, they might have prompt justice and fair settlements. The Morris Canal project would have thus regained its character; and probably the subscription would have been filled from among those who had been "refused." And if the whole capital of one million had been then prudently applied, and the aid of State credit had become necessary, it is highly probable it would have been granted, as was done in New-York to a well founded and well managed institution, the Hudson and Delaware Canal. Then too it is highly probable that Mr. Colden would have found leisure to have read *every section* of your charter, and would have discountenanced and forbidden all infringement on your rights.

But a different course has been pursued. There is no doubt the credit of the company has been retrieved. This its debts evince. But the foundation of that credit is not so obvious. From an early period it has appeared the company has had a view to the Passaic. It is probable the direction, as well as their president, *overlooked the 2d section* of your charter. Under the impression that they could legally take the head waters of the Passaic, the certainty of the Raritan Canal, or the uncertainty of the coal trade, was immaterial. This credit then is based on *oversight*.

This course of proceeding, when we consider how much other canals, with a more advantageous location, *have cost per mile*, is utterly unaccountable to calculation. There is but one way of accounting for a course else so improvident—the consistent scheme of manufacturing villages already described. All must have been founded in the hope of contending successfully against the charter of the Society. The hope of converting the Passaic waters to profit, has perhaps been the secret spring of all this boasted energy in pushing on the work; the foundation of that credit, the reason of those massive loans, and the promise, probably, of still more, when this new kind of warfare shall be victoriously concluded; and I infer the more confidently, not only from the declarations of Mr. McCulloch and the company's present pretensions, but from expressions which have escaped Mr. Colden's heart, such as "if there be any directors and members," (meaning of the Society,) that he has been encouraged to this *dernier resort*, this ultimate hope, by the *small number* of the *heirs* and *successors* of the original contributors, as well as tempted by the magnitude of the advantage of commanding all the head waters of the Passaic.

But the Morris Canal Company and their *magnanimous* president will find that the *numbers* interested in the Society will soon be augmented to the whole number of honest and honourable men in the State of New-Jersey.

Every body will see and feel that this catastrophe to one of the best institutions of the State, was not in the least apprehended by the legislature of 1791, to be possible. Their very *silence* declares this. Had they supposed it possible that a canal over Schooley's mountain would be projected, and had deemed it of more importance than the manufac-

town they were founding, they would surely have made an exception in favour of it. On the contrary, so foreign from their thoughts was this idea, that they gave the Society the right to make canal navigation leading to these manufactories, and enlarged accordingly their right to embody capital. They undoubtedly intended to give the most complete encouragement to form a permanent institution of manufactories, and sealed their good faith by a pledge of ten thousand dollars to the stock. *By this they either declared the perpetuity of the water power*, or did a most improvident act; the latter cannot be said of them—the former can alone be affirmed with truth.

Besides it was an act perfectly consistent with good policy. No exercise of legislative power was conceived at that early day to be more conducive to the public prosperity, the great source of which is industry. To bring into operation in aid of it at once a great capital and a great water power—the branches of a river flowing through one fourth of the State—was a noble object of legislation. Nor can it be less the good policy of New-Jersey, now that the progress of the nation in wealth and enterprise is rapidly transferring the manufacturing skill of Europe to the country producing all the raw materials on which it is there exerted. Thousands are annually coming from the crowded cities of England, leaving the power of steam for the pure air and mountain streams of the middle and northern states, where native ingenuity successfully improves on their experience.

Had it not been done at that early day, the time would have *now* come when (as was the Passaic) so to devote every other mountain stream, and hold them sacred to the manufacturing interest, will be the best policy of the State. Even the Delaware, divided with Pennsylvania, and brought in redundant volume to supply the summit level of the Raritan Canal, 60 feet above tide, may be made likewise to subserve this great interest; and the numerous steam engines of Great Britain be no where so effectually rivalled in America, by water power, as in New-Jersey.

What is, in fact, the usefulness of Morris Canal compared to that of accessions of active capital, an industrious population in the centre of an agricultural district, enriched by this new and near demand for its produce?

The great body of the stockholders and creditors of the Morris Canal, I do not doubt, have been under the impression, and have been made to think, not only that there was water enough for the canal from the lake, but of late, even that the company had a legal right to the head waters and branches of the Passaic. They will be even astonished at the facts I have in this letter disclosed, and that, *to all appearance*, they are as a corporation striving to retrieve their affairs by a pretension not countenanced by the State's commissioners' and engineers' reports—not found authorized in their own law of incorporation, but in direct hostility to a law of earlier date, granted soon after New-Jersey became sovereign and independent, by legislators of the most liberal and enlightened character, incapable of dishonour, with calm foresight of the distant usefulness of the permanent institution they were founding, and pledging to its pros-

perity, for, and in behalf of the State, for that period, a very large sum in its stock.

I appeal to the great body of the stockholders and creditors of the Morris Canal and Banking Company, and ask with confidence, Whether it is reasonable that *such* a charter, so granted, and so perfectly adapted to its purpose, shall have no protecting efficacy? Can be illusory and deceptive? Whether the property collected in good faith under its shelter can be otherwise *than safe*?

It seems to me that to pretend that one of the largest towns in the State, with all it contains of value, is subjected, by act or accident, to the power in any way of a recent canal company, whose whole legitimate object is alone to carry coal across the State to the New-York market; that one of the oldest and most useful institutions of the State is to become *secondary* to it, is a libel both upon the members of the patriotic legislature of 1791, and upon the wisdom and justice of those of 1824. The latter did not mean this any more than the former. The reports of their commissioners and engineers, sent out at expense to inform and guide them in framing the law then passed, contain *no recommendation* to disturb the manufactories of Paterson in behalf of the proposed canal. On the contrary, they expressly say that Lake Hopatcong affords three times as much water as is necessary to supply it from the Delaware to the Passaic. Nor did they calculate an amount of capital required to pay such damages as the disturbance of those manufactories would involve. And I ask those creditors and stockholders again, Whether they can expect to sustain the inroad their presiding officer has been making by works now actually constructed, upon the water power of Paterson? Whether he may not thus subject the company, by this overleaping of lawful bounds, to a forfeiture of their act? Whether, in that case, all that is invested does not escheat to the State? I would ask them what other form of punishment there is for corporations which transcend their legal powers than loss of privilege?

And I will remind them that their company has no authority to use water for any other purpose than to fill their canal; that the sources of its supply are designated, and they have publicly declared and acknowledged those sources *amply sufficient*.

The examination and exposition I have thus deliberately made, will produce a thorough conviction in the mind of every reader to whom the view of the subject taken is new, that there was very early formed a scheme of aggrandizement, involving in its consequences the subversion of the manufactories of Paterson; it appeared manifest in 1826—was practically pursued ever since under the presidency of Mr. Colden, and though not openly avowed, the works requisite are defended in his letter.

I am sensible it has not been in my power to do justice to the topics which combine to set forth in a clear and true light this extraordinary enterprise, which I feel at a loss how to name: a corporation being but one body, I suppose only a speculation or corporate power—an imputation that must remain a stigma on their character till the works they have constructed to carry it into effect are removed, being unnecessary to a lawful canal.

Nor is it material to the defence of your rights, in this vindication

of myself and my report, to enter much into the merits of the controversy, as your cause will be far better sustained by men of a different profession, and of great eminence, in the tribunal to which you have carried the protection of the manufacturing interest and Society. These pages are for the people.

As Mr. Colden intimates that I have "*volunteered*" from resentment to render you such professional, and even friendly services as this occasion requires, I would assure him that if I had, it would not have been on the bad motives he insinuates. I believe it was your personal acquaintance with me five or six years ago at Baltimore; and perhaps knowing that the Susquehanna commissioners had done me the honour of their confidence, which had some influence on yours. But I have no doubt that, had I accidentally learned the *merits* of this controversy, I *should have* volunteered to bear witness to the danger of utter ruin, which the command of the Passaic water as the Morris Canal requires, must necessarily bring on the manufacturing establishments at Paterson, and against the most extraordinary trespass of one corporation upon another, that has, I believe, ever occurred; but against which, I trust, the equity and the laws of New-Jersey will be your effectual protection.

Nor would the company have reason to regret being restrained within those bounds, and to that course, which will save their institution also, and enable it, if any thing will, to arrive at a profitable result. Indeed otherwise they cannot address the legislature with much prospect of success; for how can a corporation give security that renders itself so liable? They would by an injunction be relieved of a *dilemma*, from which they cannot easily extricate themselves. The President and Directors cannot otherwise have an excuse for altering their works so as to leave the Passaic waters untouched. They are authorized to use waters for the canal only. The sources are designated. They say that these are five-fold sufficient. Yet they claim more; they claim the mastery of all the branches of the Passaic. To recede voluntarily from their *chimeras*, would be wounding to pride and be out of character. They will, I doubt not, be gently repressed in their ambition, and replaced on the ground where the legislature intended they should display their branch of usefulness, without interfering with other branches.

Throughout this letter I have spoken of the company as a corporation, and not of individuals who compose it. I have aimed to prove that, as a body, they have been misinformed and misguided by their president, who appears to act with more zeal than knowledge. I should regret to think his influence in society quite equal to his apparent malevolence. I hope his motives and his character are too well understood, and while there may be indulgence towards him, there will be justice in public opinion towards myself.

I am, very respectfully,

Your humble servant,

J. L. SULLIVAN.

COL. LONG'S *Letter on the Quantity of Water requisite to Canals.*

BALTIMORE, Nov. 15, 1828.

P. E. THOMAS, Esq.

Sir—In reply to the queries suggested through you by Mr. Colt, I can merely state a few of my opinions, founded on an indistinct recollection of facts that have come within my knowledge.

The quantity of water required for lockage in canals will of course depend upon the size of the locks, and the frequency with which boats pass through them. In a regular reciprocal trade, a single lock full will subserve for the passage of two boats in opposite directions; but, owing to the irregularity of the traffic that usually prevails on a canal, it is, I believe, customary to allow two locks full for the passage of three boats, where the transition from one level to another is uniformly ascending or descending; and for the passage to and from a summit level or pound, one and a half lockful for each boat. Consequently the quantity required for lockage on a summit level, the locks having a lift of eight feet each, and their other dimensions being 96 feet long by 14 wide, will amount to about 14,500 cubic feet for each boat of 25 tons; and on the supposition that 50 boats pass daily on the canal, the expense of water for lockage on the summit level, whatever may be its extent, will be about 500 cubic feet per minute.

In regard to the expense of water occasioned by evaporation, absorption, leakage, &c., especially on new canals, it unquestionably varies in conformity to the nature of the ground on which it is constructed. On a portion of the Erie Canal, where the ground was by no means unfavourable, it was ascertained that the loss of water, on the accounts just mentioned, amounted to about 100 cubic feet per minute on each mile, after the canal had been in use for a considerable time.

In situations where the earth is loose, sandy, and bibulous, and especially where the canal is based upon the *débris*, of which the slopes of hills are usually composed, I should suppose that an allowance of 150 cubic feet per mile per minute would not be too great for a new canal. Upon this supposition, were a canal to extend 50 miles from the place where it must be supplied with water, as suggested in the queries alluded to, the quantity of water necessary for its supply, exclusive of lockage water, would be equal to 7,500 cubic feet per minute. This amount added to that required for the supply of locks connected with the summit as before stated, viz. 500 feet per minute, would require that the current at the place above mentioned should move with a velocity of about 80 feet per minute, or nearly one mile per hour.

Such a current might be generated by a declivity of about six inches to the mile, and a summit pound might be supplied through a feeder 50 miles long, provided the quantity of water furnished at the head of the feeder, was equal to 8000 cubic feet per minute.

The foregoing remarks have been hastily thrown together, and are by no means so well digested as the importance of the subject requires. They are nevertheless submitted with the hope that they may throw some faint light upon this intricate topic.

I am, Sir, very respectfully,

Your most obedient servant,

S. H. LONG.

COST OF RAIL-ROADS.

To pronounce either canals or rail-roads preferable on all occasions, would betray a want of knowledge wherewith to make the proper discrimination demanded by local and other circumstances. Among those which operate in favour of rail-roads, (were they as expensive as canals,) are prominently these:—they do not disturb the water power of the district through which they pass; they confer value, without destroying value in any thing; they operate in the winter as well as summer season, and may pass elevations where canals would be impracticable; they are far less expensive to manage. There are in any country few routes for canals; but for rail-roads wherever there is business enough for them.

In operation with horse power, at the usual walk of a horse, 3 1-2 miles an hour, he draws as much as on a canal. With a lighter load, he can go at a rate of speed which he could not maintain with even an empty boat. And for heavy loads with speed, the steam engine can be conveniently used on rail-roads, but not on canals.

It is no more objection to rail-roads that the common wheels of wagons cannot go on them, than it is to canals that *they* cannot go on them.

The rail-road must have its peculiar kind of carriage conforming to it, and landing places like canals; still it is very easy to have the arrangement of business such, that the *load bodies* of the cars may be transferred to trucks suitable to the streets of cities. The carriages must be owned principally by the rail-road company, and by licensed associations or individuals, who will conform to regulations.

The question has been much agitated, whether rail-roads cost less than canals. It is evident the comparison cannot be made without qualification. There are canals of such various dimensions, and rail-roads of such various quality, that cheapness may be affirmed of either. It is important at this period in our country to have correct information on this subject. The following remarks will promote that object as far as they go:

The climate of England is the most favourable of all others to canals. That of the United States the least so. In that country, when well located as to mines, manufacturing towns, and sea-ports, they have become very profitable; but nearly as many less judiciously placed and planned have disappointed expectation, are below par, and some abortive.

Of a list before me, 21 have cost the average of 13,500 dollars per mile.

15 of less dimensions,	13,500	"	"
7 of still less,	9,000	"	"
In America, Erie and Champlain have cost,	23,100	"	"
Schuylkill,	20,000	"	"
Hudson and Delaware, probably	20,000	"	"
Middlesex, made when wages } were lower,	17,000	"	"

The round assertion of some writers on rail-roads, that they in England cost half as much as canals, does not appear on experience to be well founded; and teaches us the important truth, that we must, in the United States, become content to go to the same or even greater expense for the same accommodation in the same form: or bring our minds to a form of rail-road better adapted to our circumstances, our economy, our long lines of communication.

The original train-ways to convey coal from some mine to a landing, with which the art began in England, had no adaptation to general purposes, and the gradations of improvement by which the rail-roads have reached the perfection of the Darlington-way, have not been without some disappointments. This work is of one track, with sidelings to turn out upon, found however a great inconvenience from the number, beyond expectation, of cars. It is said to have cost 13,500 dollars a mile. In the Quarterly Review, it is stated from a list of 500 miles, that the average is £4000 sterling, and the best kind, *with two tracks*, at £5000, equal to 22,222 dollars.

It appears that Mr. Strickland, when in England, was offered by some person in the practice of furnishing the iron, to send it out here for 12,600 dollars a mile.

The rail-road from Liverpool to Manchester, 33 miles, with four tracks, is expected to cost 54,000 dollars a mile.

The importance of having on the most frequented or great routes two tracks for

travel, and two for transportation, is evident; unless either travel or transportation be the single object of the work. A single track will do very well where the business will not support two, one for each direction; and until this be ascertained, one may be employed profitably, though less conveniently.

The inquiry, why rail-roads cost so much in England, is answered by a brief summary of the work. The ground is to be graduated, smoothed, raised, excavated, and a trench dug under each line of rail; also ditches and drains. Stones are to be broken to fill these trenches, and to cover the whole road, to keep the foundation blocks in place, and serve for paths. The iron is about half the whole expense. The American railway is in several respects different. Its object is effect with economy. The excavation and embankment may be generally avoided. The trenches are not requisite. The broken stone is not necessary. The under drains and ditches may be dispensed with. Very much less iron is required. The labour of construction is less; and by elevating the line of railway, so as to carry the load below the level of the rail divided into two parts, *one line instead of two becomes a track.*

This form of construction is the invention of Henry Sargent, Esq., of Boston, and has been put in operation, with much eclat, in England in one instance; and Mr. Palmer, civil engineer, has described its advantages in a pamphlet with plates; but it does not appear to prevail because he proposes to use *iron posts*, which makes the expense approach too near the old plan.

But in this country we propose to use the most durable kinds of timber, or else rough stone, for the posts, and locust, chestnut, live oak, or white pine, covered with a cement, for the bearers, on which the iron bars, placed as far apart as the surface allows, constitutes the track. In passing meadows, swamps, marshes, ravines, and rivers, piles are driven for posts.

There can be no reasonable doubt, that a well constructed railway of this description, with proper care, would last centuries. But as in this climate an English railway would require foundations as deep as our frost, it must cost more than in England, or be liable to get out of order; while it is easy to set posts deep enough and surround them with stone. The manner of crossing roads is not inconvenient. The cost of this kind of railway must be much less than the English form. It appears to me, one fourth as much with equal efficiency.

I am aware that prejudices are strong in favour of the *wagon*; but it should be recollected that this improvement succeeded the two-wheel car, and was adapted, by its new form of wheel, to the railway. If a new form of railway requires a new form of carriage, prejudice is absurd. In fact Palmer proves that the elevated railway car requires less force to carry an equal load than a wagon. There being no practical objection to Col. Sargent's railway car—there is none to his elevated railway, because every liability can be guarded against as well in this as others.

The *friction-saving carriage*, the invention of Ross Winans, Esq., is as applicable to this form of railway as to others, and combined make at once the *cheapest* and most efficient rail-road that has been as yet devised. That carriage is described briefly in the following article.

MR. WINANS' CARRIAGE.

This invention appears to me to be what was alone wanting to give the rail-road a decided preference over canals, except in situations where, like the Raritan and Delaware, extensive branches of natural navigation may be connected.

The reason of this important consequence of this improvement is, that the useful effect of the power employed is, without loss of time, increased four or five fold.—That a horse, instead of drawing ten tons, as he does, on the best rail-roads in England, will draw fifty tons. This has been demonstrated to many scientific men, and no fact in the art of railways can be better attested. The invention was filed at the patent office several years ago; the patent is of recent date, and this improvement will be at the service of any corporate company desirous of it. All such are invited to investigate the facts for themselves, and if the result be satisfactory, I can, as the agent of Mr. Winans, offer them liberal terms, whatever the form of rail-road preferred.

The principle of this improvement is founded in the effect of compound leverage, producing a slow movement at the bearing axle, though the carriage proceeds with speed. This machine demonstrates that slow motion between rubbing surfaces diminishes friction, in the ratio of that slowness. The object, then, of the improvement is to cause the axles which bear the load, between which and the superincumbent weight there must of course be rubbing, to move or revolve very much slower than the axles of the wheels which travel on the railway. Of course, this cannot be done with the last mentioned axles alone, but is done by the axles of wheels which are made to move by resting on the revolving axles of the travelling wheels. It may be compared to one wagon upon another, the wheels of the upper one standing on rounded places on the axles of the lower one. The upper wheels will move very slow, because they travel only the circumference of the axle on which they stand, and their axles as much slower as they are less in diameter, so that if the size of the upper wheels be half that of the lower ones, it may easily be, that the relative motion of the upper axle to that of the periphery of the lower wheel may be as 1 to 4 or 500.

But in practice, although this is the effect produced, the secondary wheels are so placed that the ends of the main axles may roll on the inside of the rim of the secondary wheels, and the carriage be no more elevated than usual, because the load body is thus hung on the ends of the main axles, and the same effect is produced.

Upon a level, smooth, hard way, the resistance to be overcome is mainly at the bearing axles. If the resistance is alone the friction, (which is nearly the fact,) this will be lessened in proportion to slowness of rubbing; then the horse may be considered, independently of his travelling onwards, as a power exerted upon the lever, which the spokes of the main wheels must be considered as being, to turn the axle; which being thus the medium of his power augmented in proportion to the comparative length of leverage, now in turn acts upon the end of the long lever of the secondary wheel, which is the medium of slowness to its own, *the bearing axle*.

The friction of the bearing weight or load, is analogous to a weight to be slowly raised by the power of the horse through the medium of compound leverage similar in effect to wheels and pinions.

The moving power is thus the relieving power.

HUDSON AND SUSQUEHANNA RAIL-ROAD, (Proposed.)

In Europe several of the most distinguished engineers have been remarkable for inventive genius in the mechanical means of extending the sphere of the profession. Practical men are not uncommonly the best able to judge of improvements in machinery, especially if success depends upon construction. This profession naturally becomes interested in inventions promotive of the profitable results of great lines of communication; and being so, in showing where such lines may be advantageously made.

A great demand for coal already exists in New-York, and must continue to augment. Whence the supply may come most plentifully, and at the least expense, is a question of no small consequence. That it must come from the great coal range of Pennsylvania is obvious; but by which route cheapest, is less so. But not principally we may believe through Philadelphia, from mines as far from that city as other mines are from New-York.

In saying that the Pittstown mines are the nearest to New-York, I mean no disparagement to the Hudson and Delaware Canal. In the comparison I have made, page 15 of this pamphlet, of the distances, I am perfectly aware that one hundred miles on the excellent navigation of the Hudson, is of very little consequence. The freight is so low that it is no disadvantage for this canal to come in where it has the proximity of a great internal market for the article, and access to New-York at little expense. No other avenue can compete with that in the interior trade; for in fact they rather debouche in *the centre of demand*, than out of the market.

The demand at and eastward beyond New-York, will give activity to that and two more avenues of the coal trade. These other two must be the Raritan Canal route to the Lehigh, and the Hudson and Susquehanna Rail-Road.

In my report on the Paterson concerns, I have described the ground in some de-

tail which this line will occupy. I now add a brief general outline of it, to induce investigation or inquiry. Meantime the surveys in Pennsylvania, and the legislative and popular measures of the several counties in New-Jersey most interested, will rapidly mature the measures requisite to its being brought before the public as an object of investment.

This future rail-road will begin on the shore of the Hudson, and reach Paterson in a very direct line, in about	15 miles.
Thence to Morristown, and thence to Drakesville, by a gradually ascending line 618 feet in 34 miles, which is 1f. in 290, or 3-20ths of 1 degree,	34 "
Thence to summit about 1 mile ascending 1f. in 50,	1 "
Thence the route is more favourable than usual to the water gap,	30 "
Thence (after crossing the Delaware by Bridge) the distance to the first coal mines is	39 "
	<hr/>
	119
Thence to the Susquehanna,	10
	<hr/>
	129 miles.

How much would it cost to bring coal from thence to the Hudson? I find an answer in the last Report on the Hudson and Delaware Canal. They have 16 miles of rail road over a surface, requiring five stations; yet their engineer states the expense of conveyance at 29 1-2 cents a ton, exclusive of toll, which is less than two cents a ton a mile. This is however four times as much as writers on rail-roads estimate the transportation in England.

That reason will justify the supposition, that on a favourable route, the expense may be between this and the English rate. I shall call it one cent a ton a mile, which will amount to

The cost of coal and quarrying,	1 20
The handling,	1 00
	0 50
	<hr/>
	2 70
The toll, as on canals, at 2 cents,	2 40
	<hr/>
	5 10

This shows the possibility of affording coal by this route as cheap as by any other.

The capital invested will be less. The cheapest railway of two tracks, rough, strong, durable and efficient, will, I suppose, average 5000 dollars a mile. But let it be supposed to cost 7000, and the capital to be one million; about 40,000 tons of coal and other tonnage would pay 10 per cent. income.

The first section of the line, from the Hudson to Paterson, would be productive immediately; the second section, to Morristown, would, I presume, pay well by country produce and return merchandise; the third section, to meet the Warren and Sussex line, would, no doubt, have much business, over and above coal, and the whole enjoy a share of the coal trade, on meeting the Pennsylvania section. The sections should conform but be separate property, though owned by the same persons.

Banks have sometimes been granted as an encouragement to public corporate works. This would not require it, though no doubt the lending of money to men in business promotive of revenue to the work, might be of use *at the interior section*, but disconnected from the rail road. I do not think the subscription to the stock of the first and second sections would be promoted by this privilege. It is better at once to have the capital large enough for the work, and the business of carrying, when the public will be better served, and the investment more sure.

To prevent speculation in the stock at first, and to give the State School Fund an advantage, the law might provide that some portion of the income, over and above 8 per cent. after expenses, accrue to the state for ever to that valuable end. This system would make it an object to open from the main avenues such branches as the public interest might really require. The state would share in the benefit of the investment as well as location, and the School Fund be always, and I doubt not, rapidly and for ever increasing.